

# The Commercial Car Journal

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## The Pneumatic Cord Tire and Its Relation to the Motor Truck Industry

**This Article Deals With the Past, Present and Future of the Pneumatic Truck Tire, Especially the Pneumatic Cord Tire and What the Future Possibilities Are in This Industry**

**T**HE advent of the pneumatic tire and the use of cords for the manufacture of tires dates back quite a number of years. It is therefore but fitting that a little history of the earlier days of the tire business be given. The average man in the automotive trade thinks of the pneumatic tire as an evolution of bicycle days.

However, that period did not record the beginning of the pneumatic tire. It was in 1845 that an Englishman by the name of Robert William Thomson, was granted the first patent on a pneumatic tire. His first tire on which patent was granted, related to "the application of elastic bearings round the tires of wheels of carriages, rendering their motion easier and diminishing the noise they make while in motion." This tire was in reality a hollow belt made of several mixtures of canvas, each saturated with rubber in the state of solution, and laid one upon another, united together with more rubber solution, after which the tube was vulcanized. The outer cover was of leather and the tire was inflated. No attempt was made, however, to recommend any air pressures in those days. The tires were 5 in. in diam. for a brougham. The tire was patented both in France and in America.

With the introduction of the bicycle, the manufacturing of rubber tires was taken up again with renewed interest. Early bicycle tires were made from all kinds of compounds in all shapes with hollow, porous or spongy centers. Most of the inventors had the thought in mind of something to give resiliency and to avoid vibration and with the idea of departing from solid type of tire for bicycles.

The first pneumatic bicycle was the Dunlop. It was simply a rubber tube held to the bicycle rim by applying wrappings of tape. Later on in 1895, the Dunlop Co., Ltd., was organized with a capital of \$25,000,000. This concern for some time monopolized the pneumatic tire field in Great Britain. It is said that in a single year this company made a profit exceeding \$2,000,000 and dividends were paid amounting to \$1,150,000. Soon after its organization the Dunlop Co. adopted the invention of Charles Kingston Welch, which provided in addition to an inner tube of rubber, a cover of rubber and canvas having thickened edges, through each of which ran a retaining wire, forming a

complete circle, the wires lying in a metallic rim specially channeled for the purpose. This might be said to be one of the earliest conceptions of a clincher tire. At the same time the Welch patent was granted an American patent was granted to Messrs. Brown and Stillman, of Buffalo, N. Y., for a similar invention. This patent was bought by the Dunlop Company for \$100,000, which resulted in the introduction of the Dunlop tire business in the United States. Another important patent was also acquired by the Dunlop Company, that of William Erskine Bart-

winding, this forming a tube. Another strip of this fabric of the same width was laid on the first and helically wound in the same manner in the opposite direction. This was practically the first attempt at a cord tire.

In the early days, the tire business was one continuous round of experimentation and litigation. But it is due to the tire makers that the rapid advance of the motor truck industry was possible.

The average reader in observing the large size pneumatics on trucks on the roads today, will hardly realize that fourteen years ago the use of pneumatic tires on public service vehicles of the heavier type was considered either impossible on account of the great weight to be carried or disadvantageous on account of low speed requirements or the liability of accidents. In 1906 the use of pneumatics on trucks and heavy delivery wagons was out of the question on account of their weight, and the greatest future that the tire companies saw was for use on passenger cars. Even in those days the manufacturers were experimenting with large size tires 7 in. in diam., with a flat rib tread of the same width, which when blown up to 150 lb., it was claimed would bear a weight of 4 tons. The tires were of fabric construction and the results were very unsatisfactory. The vulcanization, poor materials and a host of other things made life miserable for both the tire manufacturer and the owner. Tire guarantees came around a little later and quite a sensation was caused when companies announced the fact that their tires were guaranteed for 5000 miles. However, from then on the construction of pneumatic tires was gradually improved and the cord tires did not come into prominence until five years ago, at which time a few tire companies began to give the cord construction serious consideration. It is entirely due to the experimenting and expenditure of great sums of money by the tire companies that the giant truck pneumatic has been developed to its present state. To the Goodyear, United States, and the Firestone and Goodrich Companies credit is due, for the pioneering they have done in the development of the giant pneumatics. In 1910 the Goodrich Company was manufacturing a cord tire for airplane use, and in 1913 this company built a cord tire for electric

**375,000 trucks to be produced in 1920.**

**255,000 of these will carry pneumatic tires as factory equipment.**

**Big demand for pneumatics in sizes under 3½ tons.**

lett. It covered the clincher principle of tire attachment. Naturally, the Dunlop Company having the monopoly in the tire business at that time, they were very soon in deep litigation, the company in one year being a party to 162 pending suits.

The clincher type of tire was developed in the United States under patent granted to Thomas B Jeffery, in 1891 and 1892. With the appearance of the automobile the clincher tire became popular and the clincher type was considered the standard type of pneumatic, while at the same time mechanical fasteners came into use.

It was in 1893 that a special fabric cord tire was patented in the United States and Great Britain, by John Fullerton Palmer, a United States citizen. This fabric was really not a fabric at all, but simply threads laid on to sheet rubber and the material cut into strips of the desired width, the ends of which were cut on the bias. One of these strips was wound on a mandrel and the opposite edges of the strip were brought into contact in the

vehicles, in both of which the Palmer form of construction was employed.

Figuratively speaking, the pneumatic truck tire is no longer an experiment. It is here to stay. And it is the pneumatic cord tire that is destined to revolutionize the motor truck transportation business in all lines of activity as well as revolutionize the construction of the truck itself. In other words, the rapid development of the pneumatic cord tire will not be without its influence on the design of the truck. Already many manufacturers are working on new jobs in which the

farm field alone that offers the big market for the sale of pneumatics. Consider the inter-city hauling companies which practically all use pneumatics and then the bus lines. Most of the latter use pneumatics although there are some lines running on which solids are used. In such instances road conditions are more or less ideal or the bus when purchased was equipped with other than pneumatics and the change was not thought advisable.

Whether it be on the farm or on city streets, two of the important points in favor of the pneumatic tire is reduction

same piece of road can be covered at a speed of say from 10 to 12 miles per hour. Also, by increasing the average of the low speeds no great amount of extra strain is put on the truck. On the other hand, such jobs which are designed especially for pneumatics are capable of maintaining a speed of from 30 to 35 m.p.h. without the least difficulty. Features of design which are affected by the use of pneumatics will be discussed in another article.

Aside from the cushioning effect, which is highly desirable, especially in connection with a farm truck, the increased speed obtainable results in a lessening of the cost of operation.

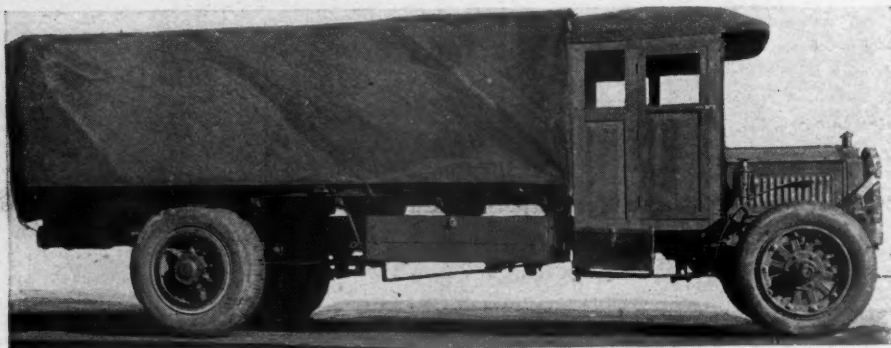
#### Operating Expense is Less

The operating expense of a truck designed especially for pneumatics is less for the following reasons: Saving in gasoline 10 to 30 per cent; saving in oil 10 to 20 per cent; saving in repair bills 20 to 70 per cent. In connection with long distance hauling, this saving is very apparent, as the pneumatics make for easier riding, in turn cutting losses by breakage to a minimum. On the farm and in hauling perishable food products to market there is less loss by spoilage, both on account of less time consumed and in less vibration. Livestock also suffers less from shrinkage.

The farmer is particularly interested in the pneumatic tire on account of its traction qualities. Where the truck is obliged to go right into the field the pneumatic tire-equipped truck is considered the best bet by most farmers. The ability of the truck to be loaded in the field and then run direct to market without reloading is one thing that appeals most strongly to the farmer. It is a direct saving of time and labor—something which every farmer is interested in today. The farm field is one in which every dealer should be interested. In another part of this issue an article appears which deals with the immediate market for motor trucks on the farm. This is an article which every dealer should not fail to read.

#### The Cost of Pneumatics

The cost of the large pneumatics seems to be the subject which is of most im-



Packard Truck Equipped With 44 x 10-Inch Firestone Giant Pneumatic Truck Tires on Rear and 38 x 7-Inch on Front

truck is being designed to fit pneumatics and not the pneumatics stuck on as an after thought.

From this it must not be surmised that the changing over from solids to pneumatics is a failure. On the contrary, the conversion is entirely feasible, but the change over must be done with discretion.

In some cases the change over is not to be recommended, but in the majority of cases the change over can be made to the entire satisfaction of all concerned. How this change over can best be accomplished and the conditions that will be encountered are given further on in this series of articles.

#### The Advantage of the Pneumatic

Although the motor truck is being operated successfully in practically two thousand different classes of business it is in the farm field that the greatest amount of business is expected by the tire companies. It is the application of pneumatics to trucks in sizes up to 3½ tons that the greater percentage of the pneumatics will be used. But it is not the

of vibration and the greater speed possible. The reduction of vibration is probably the most important of the two. With decreased vibration the life of the truck is materially increased anywhere from 15 to 20 per cent, and in addition to this the work done by the truck is increased because of the greater speed at which the truck can operate.

The greater cushioning effect obtained by the pneumatic is really what makes it possible to increase the speed of the vehicle. It is not the speed that is increased so much as the minimum speed. Many labor under the illusion that when pneumatic tires are fitted to their trucks that they are entirely absolved from obeying the speed laws. Such is not the case. It is not the maximum as much as the minimum speed that will add to the truck's capacity for work in its daily use. For instance, when a truck is solid-equipped and strikes a poor piece of road it is necessary that the speed be cut down to about 4 m.p.h., whereas with pneumatics this



The Remarkable Strides Made by Tire Manufacturers in Perfecting Pneumatic Cord Tires is Exemplified by the Above Equipment This vehicle designed by a Goodyear engineer has four wheels in the rear, with tandem axle drive. The six pneumatic cord tires coupled with the upholstery of the seats afford perfect comfort to the passengers of this bus. Equipped with one of the newest types of street car bodies, with side door entrance and exit, pay-enter arrangement, adjustable windows, upholstered seats and electric lights, the six-wheeler seats 44 passengers, and with standing room will comfortably accommodate 90. It is on giant Goodyear pneumatic tires and has a 75-hp. six-cylinder engine.



portance to the dealer and more so to the owner. At the present time it is difficult to give cost figures which give an accurate record of the actual saving made by the use of pneumatics over solids. This is due entirely to the fact that the majority of truck owners are lax in keeping accurate figures. The tire companies themselves have kept such records, all of which show that the actual saving is made

in the maintenance cost. All of the tire companies which are pushing the sale of the pneumatic truck tire are encouraging fleet owners and individuals to install a cost system of some kind so that they will appreciate real economy that is obtained with the use of pneumatic tires.

The tire companies are not selling the pneumatics on a price basis, but rather on the advantage derived from the use

of such tires that the pneumatic-equipped truck can do from 33 1-3 to 50 per cent more work. The initial cost of the pneumatics as compared with solids in certain classes of work makes the cost-per-truck mile higher, whereas in other lines the pneumatic lowers the cost. The increase in price is approximately \$200 per ton capacity for pneumatics over solids.

(To be continued)

## What Highway Engineers Think of the Pneumatic Truck Tire

**Unanimously Favor Pneumatics on Account of Lesser Impactness. Tendency to Overload When Using Pneumatics**

**T**HAT highway engineers are favorably inclined toward the use of pneumatic tires on motor trucks is conclusively shown by the statements made by these men in answer to a letter sent out to all State Highway engineers by the Chilton Company's Commercial Survey Department, asking for their opinions as to the relative merits of pneumatic and solid tires for motor trucks. The opinions voiced by these engineers are most favorable to the use of pneumatic truck tires and are unbiased in their character. The consensus of opinion seems to be that the pneumatic tire offers better traction on soft ground and that

on the rigid type of pavement, pneumatic tires are preferable on account of the lesser impact upon the roads, especially when running at high speed.

Many replies indicate that the use of pneumatics will overcome the tendency of overloading. On the other hand, in some states where hard surface roads are not the rule, but rather the exception, the highway engineer is apt to look upon the pneumatic tire as detrimental to the road surface, especially when the truck is run at high speeds varying from 25 to 35 m.p.h.\* It is claimed that on untreated macadam or gravel roads the pneumatic tire at higher speed has a tendency, on

account of the suction produced, to raise the finer particles of road materials from the base, this gradually disintegrating the road. We might also state that we have letters from certain engineers who do not look with favor on the motor truck, and if they had their way about it, they would have the twentieth century highway transportation vehicle ruled off the road altogether. In publishing these letters, we wish it to be understood that the opinions given are in no way indorsed by the editors of this publication, and that this information is given for the benefit of the trade so that it may know how our state highway engineers view the tire situation.

### Connecticut

In my opinion (and it is only an opinion), pneumatic tires are far superior to solid tires for motor trucks when considered in relation to highway damage.

We are constructing rigid types of pavement which make it necessary for the truck manufacturers to introduce some method of taking up the shock due to the loaded truck, and I think the pneumatic tire will fill the bill.

C. J. BENNETT,  
State Highway Commissioner.

### Delaware

We have been pleased to note the increase in the number of trucks which have been equipped with pneumatic tires during the past year. We believe that this will result in a lessening of the maintenance charges and a longer life for our hard paved roads. Recent experiments have proven that which has always been suspected, that impact from pneumatic tires is much less than from solid.

We also believe that the load is more uniformly distributed over the surface of pavement and much injurious vibration is eliminated by the use of pneumatic tires on heavy vehicles.

CHAS. M. UPHAM, Chief Engineer.

### Georgia

It is our opinion that pneumatic tires are the best as far as service is concerned all the way round. In sand, because they give better traction; on clay, for the same reason, and on a paved road because they are easier on the truck.

The effects of pneumatic tires on untreated macadam or gravel roads is apt to be detrimental, but for general purposes we believe that pneumatics will eventually replace solid tires throughout our section of the country.

W. R. NEEL, State Highway Engineer.

### Illinois

There is no question that the pneumatic tire is superior to the solid tire insofar as the life of the highway is concerned, as the impact from the solid tire is so much greater than that from the pneumatic. From the highway engineer's viewpoint resiliency of the pneumatic tire, thereby eliminating impact, is the chief advantage of the pneumatic tire.

CLIFFORD OLDER,  
Chief Highway Engineer.

### Michigan

It is my opinion that the future holds vast possibilities for the development and use of pneumatic tires for heavy truck duty. I am not quite willing to concede at this time that it is good practice to change over from hard tires to pneumatics on trucks of from two tons' to five tons' capacity, but I would say that the change-over is justified on lighter units. I am quite satisfied that the future will see the trucks of higher capacity using pneumatics, but the truck must be designed from the bottom up for this class of work. In changing over the heavy duty trucks that were designed to operate on solid

tires the engine is not usually designed for speeds that it will be possible to make on pneumatic tires, and in addition, by applying a large tire to the rear wheels and a small tire to the front wheels the engine is drawn out of a level position, the forward end being lower than the rear end, which necessitates a very close watch at all times on your oiling systems, as there are times when you will have too much oil in one cylinder and not enough in the cylinder at the other end of the engine.

I am, however, satisfied that with the development of a truck that is designed from the ground up for pneumatic tires that a heavy duty truck will operate much more efficiently than the present truck using solid tires and that eventually this condition will come about

FRANK F. ROGERS,  
State Highway Commissioner.

### Iowa

It is my opinion that the pneumatic truck tire is superior, both for extending the life of the truck and for extending the life of the roadbed. The chief advantages of the pneumatic tire, from the view of a highway engineer, are the large relief from truck impact; better distribution of load at points of contact with the road, this reducing the tendency to deform or break the road surface; wider use without chains and less injury to the road when chains are required.

A. S. MILER, Supt. of M. E.

**Maine**

My judgment is that the pneumatic tire is superior to the solid tire insofar as the life of the highway is concerned. There certainly must be less impact delivered by a pneumatic tire than by a solid tire, due to the cushioning effect of the air in the pneumatic tire.

PAUL D. SARGENT, Chief Engineer.

**Minnesota**

I would certainly consider the pneumatic tires for trucks to be less destructive to roads than the solid truck tire, for the reason that the impact is not so great in a pneumatic tire.

JOHN H. MULLEN, Chief Engineer.

**Nevada**

The most notable advantage of the pneumatic tire over the solid tire for use on motor trucks is that the tendency to overload the truck would be reduced. It is not uncommon to see five-ton trucks on concrete pavements, the gross weight of which amounts to twenty tons. With approximately 80 per cent of this on the rear axle this would make a load on each rear wheel of 16,000 lbs., or considerably over 1000 lbs. per lineal inch width of tire. Another disadvantage of the solid tires is that the edges of the tire become chipped and worn. This reduces the effective width of the tire in contact with the road surface. When the tire becomes

badly worn, at times the wheel is running practically on the iron rim, which, under the heavy load carried by the truck, cuts up the surface of the road. Also, portions of the tread become worn off, giving the same effect as a flat wheel on a street car. This considerably induces shock to the wearing surface.

The above disadvantages to the solid tire are ones that actually exist. They are not inherent disadvantages, as they may be readily prevented by proper attention to the tires and the loading of the truck.

C. C. COTTRELL,  
State Highway Engineer.

**Rhode Island**

As far as this department is concerned, we would welcome the extensive use of pneumatic tires because all of the roads under our supervision are hard surfaced roads, which we feel are damaged much less by pneumatic tires than by solid tires.

I. W. PATTERSON, Chief Engineer.

**South Dakota**

My observation of the pneumatic leads me to believe it is the only tire that should be used on our public highways. Of course, this tire has its limitations, but it will carry any load that should be allowed upon any ordinary public road.

FRANK S. PECK, Highway Engineer.

**New Jersey**

This department has made no tests comparing the action of the pneumatic tire with the solid tire on the various road surfaces.

It would seem to me, however, to be a decided advantage to have the pneumatic tire because the air cushion decreases to some extent the effect of the weight of the load where it strikes a hole or a bump in the road surface.

EDWARD E. REED,  
Acting State Highway Engineer.

**North Dakota**

We wish to state that in our state pneumatic tires do a great deal less damage to roadbed than solid tires. As a result of this fact there is no question but that the life of the highway is considerably longer when pneumatic tires are used.

W. H. ROBINSON,  
Chief Engineer and Secretary.

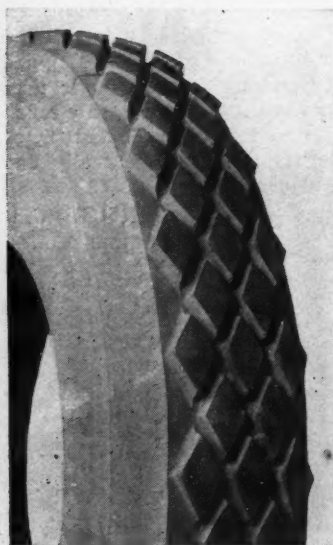
**Oregon**

The speed impact with the solid tires causes bituminous pavements to become wavy, and not only breaks the concrete slabs of concrete pavement, but starts raveling of the surface; in fact, so great is this damage to all types of roads that it is my opinion that the only solution of the problem is to use a pneumatic tire.

HERBERT NUNN,  
State Highway Engineer.

## No Two Alike and They Are All Cords

The dealer who is not familiar with the tire business does not perhaps realize that the number of manufacturers of pneumatic cord tires is growing at a remarkable rate. Not all the tires illustrated herewith are manufactured in the large or giant sizes, that is, from 36 x 6 up to 44 x 10. A great many of the makers who are now manufacturing the smaller sizes are contemplating the production of the larger sizes and expect to be in full swing by the end of the year. Many makers are visualizing the demand for cord tires for the lighter weight trucks. The owners are becoming educated to the fact that although the cord tire is higher in price than the fabric tire, it has the advantage of better wearing qualities and longer life, which makes up for the difference in price. Illustrations not received in time for this issue will be shown in our September number.



**Goodyear All-Weather**  
Goodyear Tire & Rubber Co.,  
Akron, Ohio



**Goodrich Silvertown**  
B. F. Goodrich Rubber Co.,  
Akron, Ohio



**Mason**  
Mason Tire & Rubber Co.,  
Kent, Ohio



**Racine**  
Racine Rubber Co., Racine,  
Wis.





**Republic**  
Republic Rubber Corp.,  
Youngstown, Ohio



**Oldfield**  
Oldfield Tire Co., Cleveland,  
Ohio



**Converse Triple Tread**  
Converse Rubber Shoe Co.,  
Malden, Mass.



**Miller**  
Miller Rubber Co., Akron,  
Ohio



**Kelly-Springfield**  
Kelly-Springfield Tire Co.,  
New York City



**Mohawk**  
Mohawk Rubber Co., Akron,  
Ohio



**Roamer**  
National Tire & Rubber Co.,  
East Palestine, Ohio



**Olympian**  
National Tire & Rubber Co.,  
East Palestine, Ohio



**McCreary**  
McCreary Tire & Rubber Co.,  
Indiana, Pa.



**Gordon**  
Gordon Tire & Rubber Co.,  
Canton, Ohio



**Empire**  
Empire Rubber & Tire Co.,  
Trenton, N. J.



**Nobby Tread**  
United States Tire Co.,  
New York City



**McGraw**  
McGraw Tire & Rubber Co.,  
Cleveland, Ohio



**Stanwood**  
Stanwood Rubber Co., Inc.,  
Elizabeth, N. J.



**Odell Rough Tread**  
International India Rubber Corp.,  
South Bend, Ind.



**Michelin**  
Michelin Tire Co.,  
Milltown, N. J.



**American**  
American Rubber & Tire Co.,  
Akron, Ohio



**Tiger-Foot**  
The Standard Tire Co.,  
Willoughby, Ohio



**Cortland**  
Cortland Tire & Rubber Co.,  
Belleville, N. J.



**Lancaster**  
Lancaster Tire & Rubber Co.,  
Columbus, Ohio



**Iowa**  
Iowa Cord Tire Co.,  
Des Moines, Iowa



**Falls**  
Falls Rubber Co., Cuyahoga  
Falls, Ohio



**India**  
India Tire & Rubber Co.,  
Akron, Ohio



**Madison**  
Madison Tire & Rubber Co.,  
New York City





Interlocking

Interlocking Cord Tire Co.,  
Akron, Ohio

Norwalk

Norwalk Tire & Rubber Co.,  
Norwalk, Conn.

Bergougnan

Bergougnan Rubber Corp.,  
Trenton, N. J.

Inland

Ehman Tire & Rubber Co.,  
Chicago, Ill.

Sterling

Sterling Tire Corp., Rutherford,  
N. J.

## Jottings on the Trend of Automotive Affairs Across the Sea

By Our Special Correspondent

### Date Settled for British Commercial Car Show

The fact of the moment here is that the date of the Commercial Car Show at Olympia has now been fixed for October 15 to 23 next. Seven years have passed since an exclusive commercial car show was held in England and during that period makers have gained enormously in experience, resulting from the war days, and the public have learned what truck transport really means; so both exhibits and attendance are expected to be entirely successful.

\* \* \*

### Much Hoped for From Big Pneumatics

It is hoped that the big, or giant pneumatic, as it is called, will do much to popularize big public automobiles of this sort, though hitherto it has not been anything like as widely adapted in Europe as in the United States. At present, only from 300 to 350 vehicles in England are fitted with them. America has been left to do the real research work in this quarter, and so as yet in England we know very little about them. Accordingly there is a movement on foot to hold an extensive series of trials of giant pneumatic tires under the auspices of a leading body representative of commercial car interests.

\* \* \*

### Business Prospects

Business is slacking off, chiefly, I believe, because the banks that have hitherto been advancing readily are drawing in their credit. Anyhow, whatever the cause, buyers who a few months ago were rushing for any sort of truck they could obtain, are now only purchasing

very carefully and deliberately. With increased output, now that labor difficulties are for the time smoothed over, some of the lesser known makers, even though of considerable importance, are beginning to feel the draught, and representatives of American vehicles with their 30 per cent. duty still more so, while second hand machines have gone down tremendously in value.

I have no wish to pessimise, but for the present I cannot honestly say that there are any hopeful signs of future improvement. To my mind for the next few months the British market is one in which American sellers will have to walk very warily.

### TIRE DEALERS— ATTENTION!

How to successfully merchandise pneumatic truck tires; how to give service on truck pneumatics; the best methods of taking care of your stock in hand—are some of the subjects which will be dealt with in the September Commercial Car Journal.

Not every truck can be fitted to pneumatics. The things to watch out for and the problems that come up in changing over to pneumatics will also be discussed in our next issue.

### More Wage Demand

Only a month or two ago the motor transport workers applied for a 10 shilling (over \$2) raise in wages, and as a result received 5 shillings advance. They are now demanding yet a further raise of 25 shillings (\$6) a week. If this demand were successful, it would hurt the workers more than anyone, for it would raise the cost of all but exceptional road transport above the economic limit. On a 48-hour week which invariably involves overtime, drivers are averaging about £5 a week (\$24) and as a whole are satisfied. The agitation for an advance is mainly a trade union move. Already the carriage of freight by motor is very expensive; in fact, more expensive than by railroad.

\* \* \*

### Left-Hand Steering Likely to be Penalized

In Great Britain cars in passing keep to the left, only in overtaking to the right. Consequently the driver and steering wheel are on the right side of the car. American makers who supplied the British market, therefore, fitted their jobs with right-hand steering, but during the war many automobiles with left-hand steering, commercial and private, were sent over. It is contended that with these a driver, when turning or slowing down, cannot signal to the traffic behind him to his right, which is the traffic which really matters. Accordingly the Ministry of Transport proposes to restrict the use of left-hand steering, although to what extent is as yet not quite settled. It is practically certain, however, that left steering cars in future will have no chance on the British market.

# Big Market for Pneumatic Tires in Farm Field

Impartial Investigation Shows That 800,000 Farmers Are Prospects for Trucks.  
Fifty Per Cent Express a Desire for Pneumatics

**T**HE fact that there is an immediate potential market for 800,000 motor trucks in the agricultural districts alone is something which should make every motor truck dealer get busy and get his share of the business and when it is considered that 50 per cent of this potential market wants pneumatic tire-equipped trucks, it shows that the farmer has been giving the tire subject some thought.

These figures are arrived at by the Goodyear Tire & Rubber Co., of Akron, Ohio, as a result of a questionnaire sent out to 25,000 farmers, which resulted in a 20 per cent response. This is a high average, which most any one who has ever had any experience with a questionnaire will appreciate. This response is a splendid testimony to the importance of this subject of transportation of farm products, as it represents the ideas of about 5000 individual farmers, who represent the upper third, or about 2,000,000 the total farm population of 6,700,000.

This questionnaire touched on a great many subjects of interest to the motor truck dealers, and especially such dealers who are contemplating a campaign in the agricultural districts.

As the prices of food products determine the prices of all other products, the analysis takes up the study of food production and consumption as a whole.

In 1880 the population of the country was 50,000,000. In 1919 it had gone to 106,000,000, an increase of 112 per cent. Urban population—food consumers—increased from 14,000,000 in 1880 to 55,000,000 in 1919, an increase of 300 per cent. The number of food producers increased from 35,000,000 to 51,000,000 during this period, an increase of 45 per cent. A slight ray of sunshine is found in the fact that during this period the number of farms increased 68 per cent.

But the company's report calls attention to rapidly changing conditions. Prior to 1880 most of our immigration came from the northern European countries, a population essentially agricultural. Since that time immigration shifted and now comes from southern and southeastern Europe, largely industrial workers. These gravitate to the cities, and are concerned only with making money and returning to their homes as speedily as possible. In other words, our industrial population is growing in greater proportion than our agricultural.

## No More Virgin West

Another condition confronts the nation. Heretofore as our cities have been growing we have had a West to go to. But the great regions of Kansas, Nebraska, the Dakotas and other states of the West and Middle West are no longer offering virgin land in quantities. The Secretary of Agriculture in his report last December called attention to the necessary transition from extensive to inten-

sive agriculture. Intensive cultivation and production is required along with intensive transportation. This calls for motor power for both jobs.

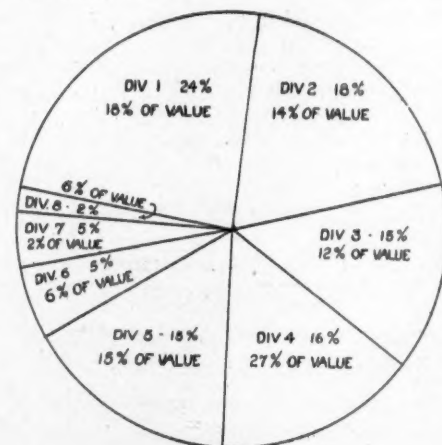
Since 1880 farm acreage has increased 118 per cent; population 112 per cent; cereal production, 100 per cent. This might not be so alarming were it not for

**DIVISION 1**  
Grain & Live Stock  
Illinois, Indiana, Iowa, Missouri.

**DIVISION 2**  
General Farming  
Delaware, Kentucky, Maryland, New Jersey, Ohio, Pennsylvania, Virginia, West Virginia.

**DIVISION 3**  
General Farming & Dairying  
Michigan, Minnesota, New York, Wisconsin.

**DIVISION 4**  
Cotton  
Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas.



**DIVISION 5**  
Grain  
Kansas, Nebraska, North Dakota, Oklahoma, South Dakota.

**DIVISION 6**  
Fruit  
California, Florida, Oregon, Washington.

**DIVISION 7**  
New England  
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

**DIVISION 8**  
Rocky Mountains  
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming.

Percentage of Crop and Values in Geographical Divisions of the United States

the fact that our production per acre has increased only 7 per cent.

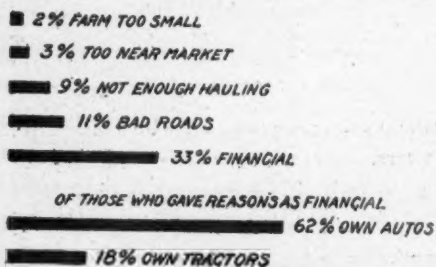
In introducing the relationship between increased food production and motor transportation, the Goodyear investigation calls attention to the fact that even now there is such a great shortage in transportation facilities that a large portion of the 1919 wheat crop is unmovable. An eminent authority in transportation has said that over one-half of our perishable farm production does not reach the market. Certainly, this opens a tremendous field for the motor truck dealer in selling farm transportation facilities.

While potentially we are one of the greatest food exporting nations in the world, we are only exporting 5 per cent. of our farm production where we used to export 25 per cent. Beef from the Argentine is being sold in the principal meat centers of the country, and butter from Denmark is being sold in quantities in one of the greatest dairy states in the Union.

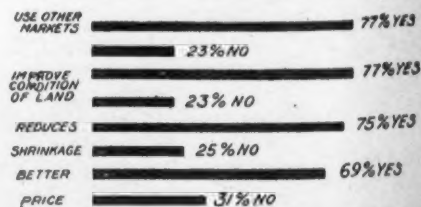
## A Rich Potential Market

Any analysis of farm truck potentialities must contemplate the buying power of the farmer. Agricultural production in 1919 was \$25,000,000,000, an increase of 678 per cent over that of 1880. Corn alone in 1919 was worth \$4,000,000,000. Even the lowly peanut produced a valuation of \$80,000,000; sweet potatoes, \$175,000,000—both minor crops. Poultry products amounted to \$1,125,000,000. American farms are going concerns with their investments already made in land, machinery, buildings, equipment, etc.

Based on information furnished by the Department of Agriculture showing the relative difference between what the farmer has received for what he has produced, and what he has paid for that



Reasons Assigned by Non-Owners for Not Buying Trucks



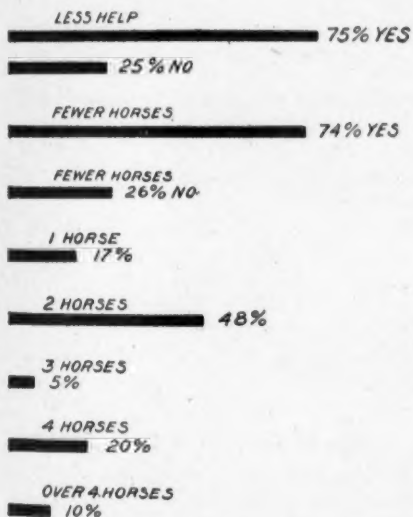
Advantages Cited by Owners Who Are Using Farm Trucks



which he has bought, some interesting data is available regarding what the farmer has done with the money he has received during the past four or five years. Taking the period from 1909 to 1913 as the basis of 100, land values in 1909 had gone to 202; crop prices to 221; live stock to 212, and farm wages to 207. It is significant that in 1917 and 1918 the prices which the farmer paid did not come anywhere near the prices which he received. In other words, he had a "velvet." Incidentally, that margin of velvet is decreasing and may be entirely eliminated in 1920.

But, of all the capital invested in the United States in the major industries of manufacturing, railways, mines and quarries, and farming, the latter represents \$85,000,000,000 or 57 per cent of the total of \$149,000,000,000, a tremendous purchasing power.

Another thing to consider in analyzing a market is the possible interest in the product. The farmer's interest in motor power must be considered. Tractors have been in production since 1912, and virtually all of the output has been absorbed by the American farmer. He has shown an interest in buying motor power for production, as is indicated by the company's estimate of 425,000 tractors on the farms today.

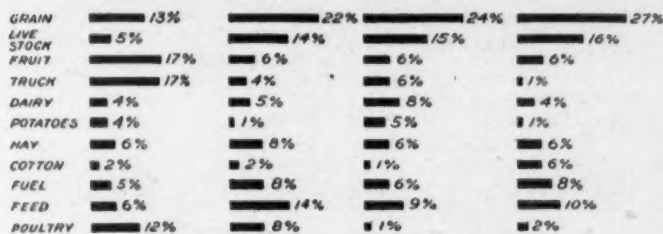


#### Economy of Farm Trucks in Horse and Man Power

161 grange masters report average saving of 1.2 men. 249 grange masters and 497 farmers report average saving of 2.8 horses.



#### Things Hauled From the Farms by Truck Users



#### Things Hauled on the Farms by Truck Users

This investigation has also considered the previous methods of agricultural production and transportation. From 1880 to 1917, which marks the crest, the number of horses and mules increased. In 1918 there was a decline of 73,000, and in 1919 of 373,000. "When we stop to consider," says the company's report, "that the horse during a period of rising prices has declined, not only in numbers, but in value per head, we begin to see the 'handwriting on the wall.'"

The company, however, takes occasion to caution the industry against creating needless sales resistance by attempting to sell trucks as eliminators of horses. Sell trucks on the basis that the truck will supplement the horse rather than supplant him.

#### Replies Represent Mass Mind

It is interesting to note that the replies to the questionnaire not only came from 5000 individual farmers, but were substantiated by replies received from grange masters representing the mass mind of more than 42,000 farmers.

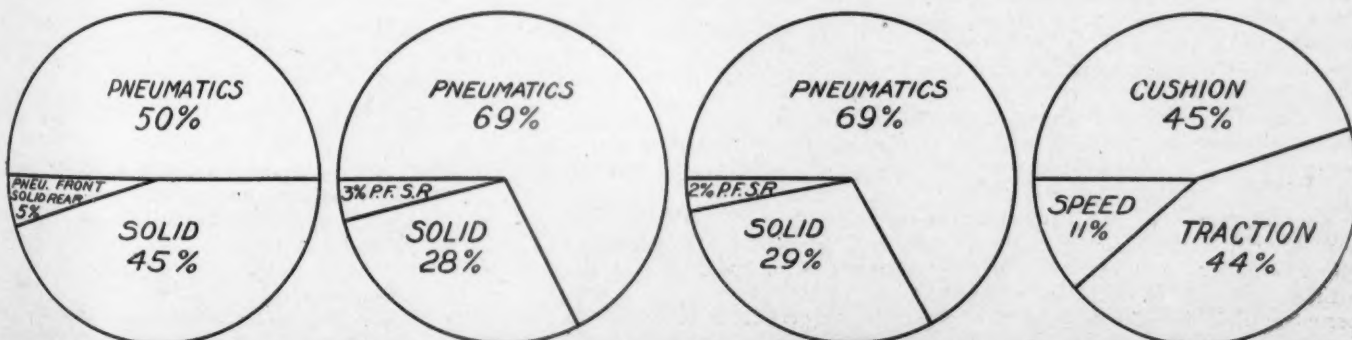
The reports upon which the conclusions of the investigation are based have been divided according to geographical lines, which primary consideration of the agricultural activities in the different divisions. The divisions also coincide with the generally accepted merchandising units or sections of the country. The

reports from each division are in almost direct proportion to the agricultural wealth of the division, and the number of farm trucks used in each division is likewise virtually in direct proportion to agricultural wealth.

Forty-four per cent of the farmers replying to the questionnaire have considered buying farm trucks. The company does not assume that this represents the total number of farmers, but for the sake of being conservative restricts its consideration to the upper one-third of the farmers, or approximately 2,000,000 farmers, 44 per cent of which, with still further reductions for the sake of being conservative, is 800,000, the potential market for farm trucks.

#### Confined to No Section

It is noteworthy that this interest is confined to no particular geographical division of the country. It is more particularly uniform from all farmers in terms of the acreages which they cultivate. Thirty-nine per cent of those replying from farms of less than 100 acres are considering buying trucks; 40 per cent of those from farms of 101 to 160 acres; 46 per cent from farms of 161 to 240; and 52 per cent from farms of more than 240 acres. The same general interest in the truck is noted in the dairying as in the fruit belt; and in the grain field as in the live stock field. This leads the company to the conclusion that neither



#### Consensus of Opinions Indicates Greater Preference for Pneumatics

The first circle represents the tire preference of truck prospects; the second and third circles disclose preferences of present truck users, the second in road hauling and the third in farm work; and the fourth circle expresses the reasons for pneumatic preference

the size of the farm nor the type of farming has any monopoly on the interest in trucks.

#### Practicability of Trucks

Another significant and important fact developed from the questionnaire replies is that 58 per cent of the farmers not now using trucks consider the trucks practical; 58 per cent are convinced that there is no physical reason why they could not use a truck.

The company next considers the other 42 per cent, which evidently considers the truck impractical. Seventeen per cent of these are found to own tractors, and 72 per cent automobiles. This is evidence that there is a fertile field into which must be carried the story of what the truck will do on the farm; not what it will do for the city man or interurban hauler, but what it will do for the farmer on his farm; not whether it will haul bricks, but whether it will go into the soft field and move his crops.

As evidence that this field will bear cultivation, 76 per cent of those who say the truck is impractical are hauling something in their automobiles. They still need to be shown that an automobile is not built for hauling, but that there is a special motor vehicle for that purpose.

#### The Size of Farm Trucks

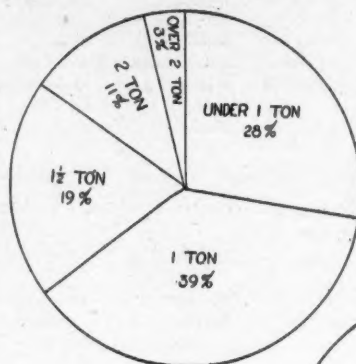
Another interesting feature of the investigation is the relative interest in trucks of various sizes, especially on the part of those who are not yet motor truck users. But little interest was found in a truck of less than 1-ton capacity. A marked interest was found in the 1-ton, 1½-ton and 2-ton. Forty-one per cent of those with less than 100 acres are interested in the 1-ton; of those farming more than 240 acres, 22 per cent are interested in the 1-ton, while only 1 per cent are interested in a truck of less than 1-ton. In the larger acreages, 39 per cent are interested in the 2-ton, while 26 per cent of the farmers farming less than 100 acres are interested in a 2-ton.

An interesting contrast is brought out in the report as regards the comparative interest in tractors and trucks. The company states that the tractor is found to interest farmers in proportion to the size of his farm. But 8 per cent of the farmers owning less than 100 acres are using tractors, while 39 per cent of those with more than 240 acres farm with tractors. On the other hand, the size of the farm seems in no way to influence the interest in trucks. Were the tractor adaptable to transportation requirements, the company believes there would be a much greater proportion of tractors in use on the smaller farms.

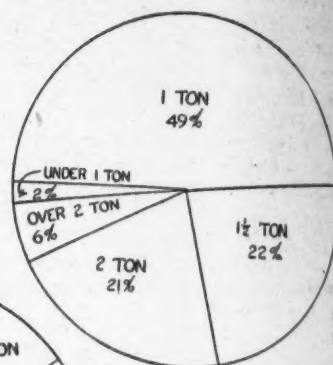
#### Reasons for Not Buying Trucks

The questionnaire goes into the reasons for not having bought trucks, in an effort to determine whether any negative attitude existing should be considered permanent. Thirty-three per cent of the farmers cite reasons which can be properly classified as financial; 11 per cent cites bad roads. The fact that 33 per cent of the two million best farmers cite

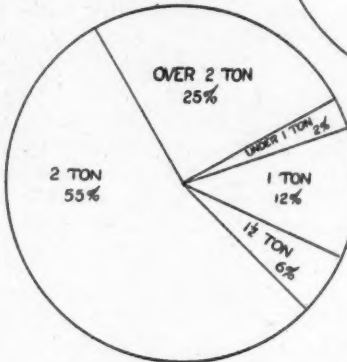
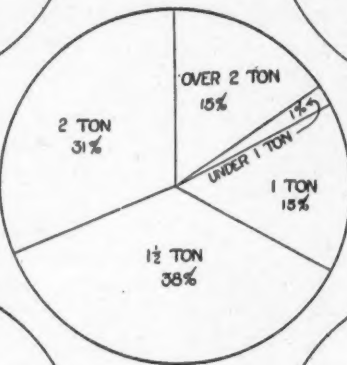
Now Own Less Than 1-Ton, Will Buy



Now Own 1-Ton, Will Buy

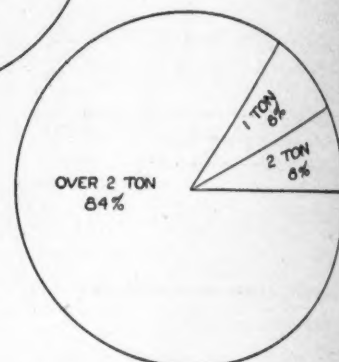


Now Own 1½-Ton, Will Buy



Now Own 2-Ton, Will Buy

Now Own Over 2-Ton, Will Buy



Size of Next Truck Preferred by Truck Owner

financial reasons might seem to refute the company's analysis of the farmer's buying power were it not for the fact that of this 33 per cent, 62 per cent has already invested in automobiles and 18 per cent in tractors. It is evident, therefore, that the farmers are sold on certain applications of motor power, but have not yet been brought to realize the importance or necessity of motor transportation, and that on this account the financial outlay to them does not seem warranted.

The subject of pneumatic or solid tires has been discussed considerably during the last two years. The farmer's attitude on the subject is therefore worthy of interest. Of those who have not yet bought trucks, 50 per cent express a desire for pneumatics when they buy; 45 per cent specify solids, and 5 per cent specify solid rear and pneumatic front. The latter 5 per cent volunteered the information; it was not asked in the questionnaire. This fact shows that farmers are interested in the tire question.

#### The Type of Body

One important feature of the farm truck is its body. The body determines the efficiency of the truck as applied to farm operations. Classified according to farm acreages, it appears from the replies to the questionnaire that grain is the principal farm product hauled, with live stock second. Dairy products, fruit,

truck crops and cotton in the South are the next most important commodities handled by farm trucks. The company's conclusion is that while the body must be designed to carry grain and live stock, it must also be designed to carry fruit, dairy products, truck produce, potatoes, hay, cotton, poultry, fuel and feed.

#### Those Who Now Own Trucks

Thus far the questionnaire's replies have considered only the attitude of the farmers not yet owners of trucks. What truck users have to say is important as furnishes information to answer the questions of the man who should buy a truck. Their experiences are interesting. They have been confined largely to two classes. There has been the smaller farmer with 100 acres or less who has farmed intensively and has a qualitative hauling problem, large perishables; and there is the farmer with more than 200 acres who has been a "quantitative" truck user with the bulky products of his farm.

Some of the advantages which these truck owners have found has been the ability to select a market, and deliver their loads to these markets in better condition and at a better price.

An important bearing on the farm labor situation has been exercised by motor trucks in the hands of farmers. The replies from grange masters indicate that 75 per cent of the farm truck owners report a saving in farm help. Sev-

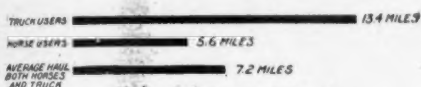


enty-four report that fewer horses are required. Of those who have dispensed with some horse equipment, 17 per cent have done away with 1 horse; 48 per cent with 2 horses; 5 per cent with 3 horses; 20 per cent with 4 horses, and 10 per cent with more than 4 horses. The fact that 74 per cent of the farmers are reducing the number of horses is significant as every time a horse is sold, five acres is added to production for human needs.

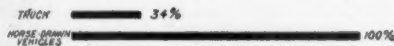
A feature of an analysis of the use to which farm trucks are put is the fact that one-third of their service is found to be for general farm hauling on the farm—a condition which the company attributes largely to the use of pneumatics.

#### Hauling for Other Farmers

Fifty-three per cent. of the truck owners, according to the questionnaire, are hauling for other farmers. This indicates an interest in rural motor express, and it also shows that seeds are being planted which are eventually to result



#### Distance to Market Used Most



#### Time of Market Hauling by Truck Compared With Horse-Drawn Vehicle

in sales. Just as the farmer adopted the tractor as it was built in sizes for individual farms, after he had seen the work of the larger sizes, just so will farmers use their own trucks once they have had a taste of hauling their produce to market on their neighbor's trucks. They will also become users of rural motor express as it is perfected. Thus many of the 4,700,000 farmers not included in this analysis are possibilities for the near future.

From its reports from truck users, the company makes an interesting analysis of farm truck sizes. Judging from the sizes now in use there is a marked preference for the 1-ton, especially among the farmers operating less than 100

**The Goodyear Company draws the following conclusion from its investigation:**

"We have a great field in the farm market for motor trucks. We believe that this opportunity affords not only a chance for profit, but a chance for real service, as every motor truck sincerely built and honestly sold will have a very visible effect in meeting the problems of increasing our food products for domestic consumption and export.

"Nothing should be allowed to interfere with the production of trucks, tractors, automobiles and motorcycles to be bought by farmers," says the report in conclusion. "They are just as necessary as the plow, the harrow and the threshing machine. They add to the farmer's equipment, make him efficient and contented."

"We have had a taste of what might happen if we were to continue our national disregard for our fundamental wealth. We must all lend a hand in meeting this neglect of our agriculture. There are many things bearing directly on this problem.

"Farming must be motorized as industry has been. With the successful motorization of farm work we need have no worries about our position among the nations of the world, for our food supply will be guaranteed, and with other nations dependent upon us for a share of their food the world's peace will be more certain."

acres, and there is also a uniform use of the 1-ton size among the farmers with larger acreages from 101 to 160, and from 161 to 240. Present use also shows a great interest in 1½- and 2-ton sizes, with a fairly keen interest in less than 1-ton and more than 2-ton trucks.

But the interesting feature is in the size trucks these users will buy next time. There is relatively less interest in the less than 1-ton. There is a conspicuous interest in the 1-, 1½- and 2-ton sizes, and there is also considerable interest in more than 2-ton. The company concludes from analyzing these replies, however, that the dominant interest will be in 1-, 1½- and 2-ton trucks.

#### Future Tire Equipment

Sixty-nine per cent of the present users of farm trucks in replying to the questionnaire stated that their next truck would be pneumatic-equipped. Twenty-eight per cent will stick to solids, while the remainder prefer pneumatics in front and solids in the rear.

The reasons underlying these conclusions are interesting. Forty-five per cent of those specifying pneumatics prefer them because of their "cushioning" qualities; 44 per cent give "traction" as the reason, while 11 per cent attribute their choice to the saving in time afforded by pneumatics. "Cushioning" means smoothing out the rough places in the road, keeping the load in better condition, reducing shrinkage to the minimum and adding to the life of the truck and the road. "Traction" means ability to go in soft fields, wet meadows and any place on the farm and back again.

Shortening the distance between farm and market is brought out in the company's report as exerting a strong influence on real estate values. The reports show that the truck is enabling the farmer to double his distance from town, as with a truck he can haul 13.4 miles as against 5.6 miles with horses. A farmer with a truck can go outside his customary trading radius, buy cheaper land, produce economically and at the same time be within easy distance of his market.

## Dealers! Are You Losing a Bunch of Money Each Year on Trade-Ins?

**Then Read This Article and Learn How the New York Dealers Are Tackling the Problem. Any Real Dealer Organization Can Put the Plan Across**

By C. H. COREY

Mr. Corey is manager and secretary of the Metropolitan Dealers' Motor Truck Exchange, Inc. Mr. Corey has been actively engaged in merchandising trucks for a number of years and conducting service in New York City

**T**HE statement was made at a recent motor truck conference that at the beginning of 1918 there were 90 motor truck dealers in the city of Chicago, and that at the end of the year but 10 of these were in business.—Why?

We know that, during 1919, 50 per cent of the dealers in New York either changed the lines they represented or went out of business.—Why?

There are a number of factors contributing to this turn over but there is one which is the greatest evil and if persisted in, eventually bankrupts a dealer. I refer to the trading-in of old trucks—the brainy game of getting the original profit out of some other make of OLD truck, rather than from the make of NEW truck which the dealer sells.

The trade-in evil became so pronounced in New York that a number of reputable dealers became alarmed. Meetings were called at which the subject was discussed and the conferences, which were inaugurated by the Motor Truck Association of America, Inc., extended over a period of several months. While a number of the older dealers were aware of the effects of the trade-in others began to ask

themselves the following questions: "What proportion of our prospects have used trucks to trade in? How much business do we lose by not accepting old trucks as part payment for new? How much money have we tied up in used trucks, and not of the make we sell? What proportion of our business necessitates the appraisal of taking in the used truck? Are we working to distribute trucks for the factory or to make money for ourselves?"

#### Form a Truck Exchange

After many meetings, at which various methods of solving the problem were discussed, it was finally decided to organize the Metropolitan Dealers Motor Truck Exchange, Inc. The plan was for each member to subscribe to \$1,000 worth of stock, to have a minimum membership of 25, and that the exchange would appraise, take in, repair and resell the used trucks taken in trade by the members. It was proposed to establish a repair shop and sales room.

Owing to changes in the trade and the attitude of some dealers to desire to wait and see how the plan worked out, the 25 who agreed to join was reduced to such an extent that it was not considered advisable to begin operations on the original plan. Therefore, on Feb. 1 of the present year, the Metropolitan Dealers Motor Truck Exchange began its activities as an appraisal bureau serving those dealers who remained in the organization. Offices were rented at 1790 Broadway, and a manager appointed. The staff includes three inspectors and a stenographer.

The appraisal bureau functions as follows: A motor truck salesman having a prospect who wishes to trade-in his used truck, notifies his sales manager or other person in charge who in turn calls up or notifies the manager of the bureau. A form is employed for the notification and this same form is utilized by the bureau for making its report. On receiving notice there follows an actual physical inspection of the truck by one of the inspectors who makes out a detailed report as to the condition of the chassis, the body, equipment, etc. A value "as is" is given also an estimate of the cost to place the truck in a selling condition. The "as is" value is that in the open market.

#### Inspections Checked by Manager

The report turned in by the inspector is gone over by the manager and a value determined, and it may be that a second inspector goes over the truck. Conferences with the inspectors are factors determining the value. There are other factors considered such as the market value and the appraisal of similar models, etc. All data is indexed and filed so that quick action is given a member on a number of models of various makes.

After the appraisal price or value has been determined it is supplied to the member requesting it. This price is adhered to in making a new contract. Should another member request an appraisal on the same truck, he is advised as to the date on which the former appraisal was made and he either accepts it or asks for a new revaluation. In the event the new appraisal is at variance with the original,

who had been doing well (for himself) both members are notified, the plan being at all times to operate on as fair and as just a basis as possible, not forgetting that the main idea is not to hamper the members in their legitimate business of selling trucks. In case members of the exchange are in competition with other dealers who are not members (no member dealer being involved) every effort is made to enable him to meet this competition if he thinks it is advisable. The charge to each member for a detailed appraisal is \$5.

The plan is not 100 per cent perfect by any means. One must take into consideration the human equation, but it is surprising how certain conditions are remedied when direct and straight from the shoulder methods are practiced. Dealers brought face to face, made acquainted



C. H. Corey

Manager and secretary of the Metropolitan Dealers' Motor Truck Exchange, Inc.

with each other, are not as likely to persist in unstable business-like methods as they would if they were not in personal contact.

#### Results Obtained

Of course, dealers can put trucks "on the street," but this is only pulling the factory chestnuts out of the fire. The fact should not be lost sight of that the factory is getting its manufacturing percentage, first, last and all the time. Trade-in losses all come directly out of the dealers' pockets. Right away I hear a great chorus of "We don't trade-in, we only take them at junk prices. We know what we are doing. We always make money on our used trucks." That's only talk or when deliveries are slow due to transportation problems. Personally, when I have been in competition with some of these dealers, I have found that they have been the best educators the customers have had, in the way of what to expect in the matter of generous allowances. The cancer still exists. Sometimes the character of the opposition is indicative of the worth of the organization. If you were the dealer involved would you care to retain the salesman

just as long as he had been allowed the latitude necessary to outbid and outbuy his competitors, but couldn't get his price or sell his truck against competition when he was held down to the actual worth of the used truck involved? You answer it.

Would you care to retain the sales manager whose only object is to talk about the number of trucks he put on the street last year, utterly ignoring the question of net profits from his operations? Again, you answer, Mr. Dealer.

#### Cutting the Other Fellow's Throat

One of the largest concerns in New York plainly stated that they wished to be free to cut their competitor's throat. Of course, this sounds more childish than business-like, but it is the plane upon which truck selling is being conducted today and will continue until governed by an adequate business organization which sees light from within. The short-sighted manufacturer who objects to the control of trade-ins, has in mind the immediate curtailing of his deliveries temporarily, forgetting that following this he is taking the most direct road to the elimination of the dealer.

The dealer is first to be considered. He has the responsibility. Is he interested in volume business for the factory's benefit or profits for himself? Why not both? But he **will have no profit if he has a number of used trucks standing on his floor** generally not salable until they have been through the shop and have tied up as much more in the cost of repairs as was originally allowed, to say nothing of the profit. Two commissions are paid to make one profit and that problematical. If the dealer persists in working on these near business principles, the sheriff takes care of him and automatically. The better the salesman, the more he advocates appraisals by an unprejudiced central bureau. It allows him at all times to be a **seller of his own trucks, not a buyer of his prospect's truck**. At present the salesman tries to be both, and the better buyer he is, the worse salesman he is.

If, in order to buy well, he disparages the used truck, he antagonizes the prospect and lessens his chances for the sale of a new truck. I haven't noticed many of them doing this. They are generally good bidders against each other and the prospect is wise enough not to stop them. As a matter of fact, **THE PROSPECT OFTEN IS THE BETTER SALESMAN. And ADHERING TO APPRAISAL PRICES WILL SOON TELL THE DEALER WHETHER HE HAS A REAL SALES FORCE OR NOT.**

#### Must be Interested in Profits

If the sales manager is as good a business man as he is a salesman, he must be more interested in having profits on the books, than used trucks on the floor. This brings us to the point—can he pass this responsibility to the used truck department? The answer is **no**, that is, if the used truck department is alive. In a properly conducted used truck department, part of the compensation of the manager is contingent on his moving the used trucks successfully, promptly and profitably. He just about doubles his charge



of doing this when his judgment is backed by an appraisal. Our bureau doesn't experience much opposition from the head of the used truck department, except when he thinks he is going to lose his job.

Past experience proves that the entire dealer organization must be sold on the "same appraised price for everybody" idea. Now for the banks and financing companies. The conclusion is so obvious and their statements to us so to the point that it is not necessary to go into it. How about the customer, who as stated above is generally the better salesman as proved by existing conditions? In a majority of cases he has more respect for a concern that adheres to sound business principles—knowing that otherwise they will not last long—than he will have for the other type. The business man realizes that owning a truck for which parts are not easily secured is not a profitable investment. He also realizes that inspections and appraisals made by competent men and an unprejudiced organization is based on the actual condition of his truck and is, therefore, fair. When these facts are presented in the right light, he is open to reason. Sales have actually been made in which it was stated in the contract that the allowance for the customer's used truck would be fixed by the appraisal price at the time of the delivery of the new truck. This speaks for itself.

#### Will the Dealer Lose Sales?

Will the dealer lose business by being in an organization that adheres to a common appraisal price through competition with non-members? In some cases—yes. In most instances—no! If the major part of his business consisted of this volume of business so lost it would, as it has done in the past, automatically put him out of business. Recently we appraised two Fords at \$275. You can imagine their condition. Non-member competition offered \$1200. You know what the price is new. Would you object to losing business like that?

Recently a case occurred in which a non-member had one of his men represent himself as being one of our appraisers. He must have placed some value on our system.

Most dealers when asked to join our organization desire to wait until it has become 100 per cent perfect. In the meantime they are not waiting for their trucks to be 100 per cent perfect before marketing them. We have been actively engaged for six months, have made approximately 1,000 appraisals, and the majority of members state that the system has saved them money. This, in spite of the fact, that during the past six months it has been easier to sell new trucks than it ever was before. These conditions occurred, owing to a decreased factory production and lack of transportation facilities. There was a market in which used trucks were difficult to secure and exceptionally good prices were obtained. Another responsibility which should be accepted, is control of the character of the manufacturers. This is something that they have long "side-stepped" to their sorrow. Their attitude, that any man financially able to buy one or more

chassis (this being another factory outlet) is fit to be a representative, in the larger sense, has not only proved erroneous, but a financial failure. The co-operation of every manufacturer active in New York was requested, but only five or six replies were received. "They were not especially interested at that time." At present we have direct requests from four manufacturers to procure dealers for them.

#### How New Members View Bureau

After we had been in operation a few months members were frank in commending the plan and we have some very nice letters commending the policies. Excerpts are as follows:

"From the very beginning of this appraisal system we have felt its most beneficial effects. To begin with, it saves a tremendous amount of the time of an important executive, by making it unnecessary for him personally to travel to inaccessible places at inconvenient hours in order to make an appraisal. In addition to conserving his time, we get the benefit of expert opinion guided by carefully kept records in connection with any valuation. The actual price per appraisal is so trifling, that it seems only a nominal fee. The conscientiousness with which the work is done is worth all the commendation we can give it.

Regarding the tendency to allow more

than the actual trade-in value, if there were ever any inclination to stretch appraisals, that inclination is entirely overcome by the knowledge that our fellow members are playing the game according to the rules.

As for the effect upon our customers and our sales staff, there's no disputing the fact that even with its scant publicity the prestige influence of a central appraisal system is quite evident. We've actually secured a signed order with trade-in value unknown where the customer agrees to accept the appraisal made by our Exchange. A salesman armed with an appraisal report very rarely complains that he is handicapped. Aside from the fact that the valuations are fair, he realizes that his customer respects the arguments behind a report of this nature."

\* \* \*

"We could not appraise used trucks at anywhere near the cost for which we receive such appraisals from the Exchange and we have the added advantage of being in a position of presenting an appraisal to our prospect which must be entirely unbiased as it is made by thoroughly disinterested parties. We find that many prospects appreciate this and that the only sales we lose are from such classes of trade as we would probably not be able to sell anyway, by reason of their demanding excessive prices for their used equip-

Appraisal Report						No. _____	
Metropolitan Dealers Motor Truck Exchange, Inc.							
Ordered by _____			Date _____				
Owner _____			Phone No. _____				
Address _____							
Make	Model	Capacity	Year	Chassis No.	Motor No.		
Chassis _____		Paint _____		Steering _____			
Tires {	Front-R _____	L _____	Radiator _____				
	Rear-R _____	L _____	Front axle _____				
Wheels {	Front-R _____	L _____	Springs { Front _____				
	Rear-R _____	L _____	Rear _____				
Motor _____	Make _____		Fenders { Front _____				
				Rear _____			
Clutch _____	Make _____		Body _____ Type _____				
				Length _____ Width _____ Height _____ Inside _____			
Transmission _____	Make _____		Condition _____				
Rear end drive _____	Make _____		Cab _____ Windshield _____				
				Lamps _____ Horn _____			
				Cushions _____ Curtains _____			
				Extras _____			
Sprockets, Front _____	Rear _____						
Chains _____	Propeller shaft _____						
Remarks _____							
Estimated cost of repair work: _____							
APPRAISERS ALLOWANCE _____			Appraiser _____				
AUTHORIZED ALLOWANCE _____			Signature _____				
Note _____							

#### The Appraisal Form

Details of condition of chassis, body, equipment, etc., are entered by inspector and copy is supplied members of the exchange. The original is kept on file

ment and playing the game of getting one dealer to bid against another. Our salesmen also feel better satisfied with the Exchange's appraisals than they did with those made by ourselves owing to the fact that they realize that many other responsible companies are working on this same basis and that it must be an absolutely fair one."

\* \* \* \*

"Owing to the very close margin of actual net profit made by motor truck dealers when overhead and maintenance of service, etc., is taken into consideration, we do not see how any reputable firm can afford to be without this service and certainly feel we can recommend it highly to any one who may be interested."

\* \* \* \*

"We are firm believers in organization, believing that no large business enterprise will succeed on a broad scale without organization. The advantages to be derived from an association such as the Metropolitan Dealers' Motor Truck Exchange are too numerous to be calculated. The bringing together of the motor truck dealers in the City of New York under one organization has the effect of central-

izing the efforts of each individual dealer, making it possible to use their combined influence and efforts to the benefit of the dealers as a whole, as well as individually.

We find the Exchange exceedingly helpful in the regulation of the used truck problem. The central Appraisal Bureau having the effect of regulating the allowances for used trucks, standardizing the market, so to speak, on used truck values, proving of great benefit to both user and dealer. We find that it has a very healthy effect upon the salesman.

The Exchange has been very beneficial in bringing the dealers together on a common ground and with a common understanding and object in view."

\* \* \* \*

"I believe that every dealer in trucks should belong to the Exchange, and if they were, each and every one would be saved many thousand dollars every year. There is no possible reason why every concern dealing in trucks should not belong to an organization of this character. Nothing but benefits could possibly arise from such a membership.

Co-operation and meeting with one another face to face bring about results

which cannot be obtained in any other manner."

\* \* \* \*

"It is certainly gratifying to find that a number of competitors who were before solely bent upon cutting each other's throats, should prove as they have proven since the Exchange went into operation that they can work in absolute harmony. There is nothing unusual about this, because there are similar organizations in other merchandising lines, but I think that results are, nevertheless, surprising in view of the bitterness that formerly prevailed.

It seems to me that with conditions as unusual as they now are, that this is an opportune time to prepare for difficult selling conditions later on that we must meet. The natural inclination would be to wait until that time, but if the dealers that have not yet joined our Exchange would use a little forethought, they would see the many advantages to be gained by co-operation, particularly when selling conditions return to normal and it is the customer's inning. The appraisal system has worked very well, indeed, and it is only a sample of what actually may be accomplished on a bigger scale and along the lines we ultimately plan to reach."

## Trade Conditions in California and Arizona

By A. V. COMINGS

This, the second of a series of articles by Mr. Comings, who is investigating conditions as to the potential market and sales possibilities of motor trucks along the western coast

CALIFORNIA is destined to become one of the great motor truck using states. A careful survey of the elements contributing to the wider use of motor trucks leads inevitably to that conclusion. Already her great and her lesser cities are bound to constantly increasing dependence on motor truck transportation, and in certain sections her magnificent highways rumble from dawn till dusk, and sometimes through the night, with the passing of heavily laden motor freighters. Motor stages connect practically every city, hamlet and desert water tank town with its neighbors and with nearest railroads.

Yet all this present use of the truck is merely a beginning, and California and

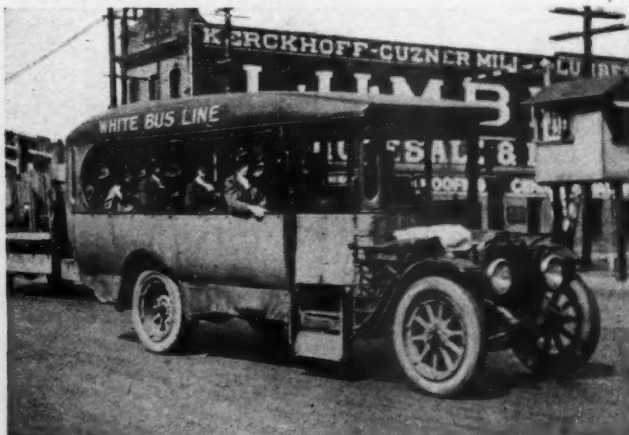
its tributary territory holds out a future for the manufacturer and dealer in motor trucks as bright as any state in the union.

Like most western states, California is big in area. Within the boundaries of the state lies as much land, and a little more, than makes up the states of New York, Ohio, Maine, New Jersey, Massachusetts, Connecticut, Vermont, New Hampshire, Rhode Island and the District of Columbia. Some of it is mountainous, some of it is arid desert, but the fertility of her available soil is marvelous. And the energy and industry of her forward looking citizens is so well applied that within the next decade hundreds of thousands of acres of land now dormant and arid will be brought under water's magic

spell, and the increased development of water power and other resources now locked in her mountain ranges far from railroads will add tremendously to the demand for highway transportation of both passengers and freight.

California's cities will continue to reach out and expand, as the late census shows they have grown in the last decade, and with their continued growth will come a permanency and stability that will be of as great value to them as their increase in population.

The tendency on the part of far western enthusiasts to "talk big" has made it very hard to impress the layman with the really tremendous productivity of California. He puts it down as "boom stuff," even when it



A California Motor Stage. There Are One Thousand Five Hundred Motor Stage Lines in the State



Hero of Indian Fights and Holdups, This Stage Has Given Way Forever to the Modern Motor Vehicle



is gospel truth. The fact is, however, that California produces a marvelous variety and quantity of agricultural products, and nearly all of them are of the kind that motor trucks are particularly well adapted to handling. Here are a few figures on what the state produced last year; read them over carefully and try to visualize the constantly growing fleet of motor trucks that is being used in handling this almost unbelievable quan-

omically, and with less damage and deterioration with motor trucks on pneumatic tires or cushion wheels than they ever thought of doing with the old horse and mule method. The result is a steadily growing stream of motor trucks is pouring out of distribution points into the ranching districts.

In California, more than in many other states, conditions are assisting materially in hastening the coming of the motor

substitute. These various conditions are all hastening the day when the motor truck will be the universal transportation medium in the ranching districts.

At present most of the transportation of standard crops is done by contract haulers, who own their own fleets of trucks and move from place to place, within a limited area, handling the crops as they mature. For instance, when the cantaloupe crop begins to ripen in the Imperial Valley, the contract haulers, who have already made their arrangements with the growers, start their work, and practically all of the 16,000 carloads of cantaloupes shipped out of this marvelous valley are hauled from the packing sheds on the ranches to the 40 shipping depots in El Centro, Brawley, Westmoreland, Heber and the other cities along the rail-



Typical Overload of Hay Rolling Into Los Angeles

tity of produce, every pound of which has to be moved from fields to barns, warehouses, railroads or other destination:

Seventeen million boxes of oranges; 5 million boxes of lemons; 17½ million bushels of peaches; 8½ million bushels of apples; 4 million bushels of peas; 4½ million bushels of beans; 30 million bushels of barley; 16 million bushels of wheat; 11 million bushels of potatoes; 8 million bushels of rice; 3 million bushels of onions; 821,000 tons of sugar beets; 4 million tons of hay, mostly baled; 180,000 tons of raisins; 430,000 tons of grapes; 130,000 tons of prunes; 165,000 tons of apricots; over 10,000 bales of cotton; 15,000 carloads of cantaloupes.

A glance over that list will immediately suggest to the thinking man that most of these yields are handled either in boxes, crates, baskets, sacks or bales, any one of which is ideal for handling in motor truck shipment. And the ranchers who are producing this wonderful array of crops are fast discovering that they can handle their produce faster, more econ-

Imperial Valley Ships Eight Thousand Carloads of Cantaloupes, Most of Which Go to Trains on Motor Trucks



truck. The good roads are a big factor, the intense heat in some of the most productive valleys during the time the crops must move, is killing on horses, much of California's crop is of perishable nature, and speed in handling from field to refrigerator car or warehouse means dollars added to its eventual value, and added to all of this is the excessive cost of horse feed in the state. Another big factor that is forcing truck transportation is the rapid growth of tractor farming in California. No state is growing faster in the use of the tractor than California, and as horses are done away with in crop work, they can hardly be kept for hauling produce alone, and the truck is the inevitable

way. These shipments rise from the first carloads, which bring as high as \$50 to \$60 per crate in eastern markets, to nearly 400 refrigerator carloads a day in the height of the shipping season, and long lines of motor trucks, discharging the crated cantaloupes, are an all-day sight at the shipping centers.

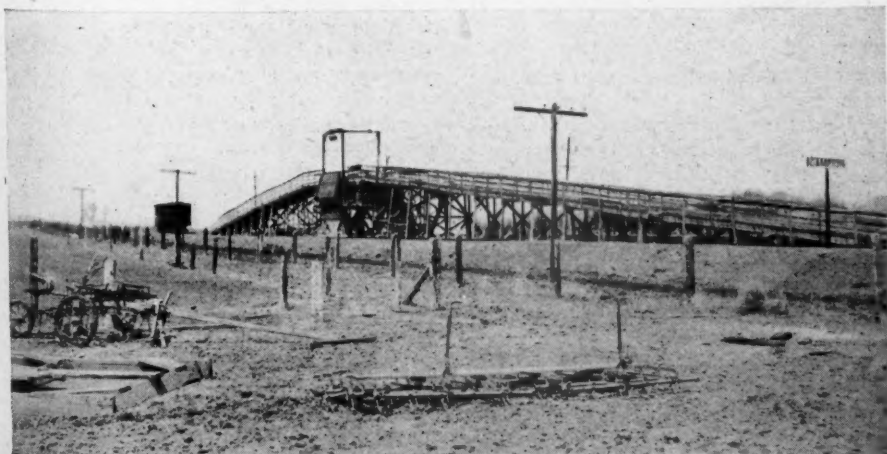
This same method is in use in the citrus belt, and in other localities where seasonal hauling is the rule. Between crops the trucks are kept busy hauling supplies for the ranchers and in doing other work that keeps them profitably busy.

#### Rancher Wants Pneumatic-Tired Speed Truck

Little by little, however, the California rancher is coming into the ownership of his own truck, and dealers throughout the state told me that their sales to individual ranchers are constantly growing.

Trucks used in ranching run from one to two tons, with occasionally a 2½-ton size, and practically always nowadays with pneumatic tire equipment. The ton and ton-and-a-half size are the most general types, and there has been a big demand for the speed trucks of these sizes recently put on the market by standard makers.

Personally, I believe there is a great future for a fast 1½ to 2-ton truck among California ranchers. The roads are such that speed may easily be maintained most of the time, and a slow truck does not meet with favor.



Typical Beet Dump Where Trucks Deliver Sugar Beets in Southern California

Among the contract haulers the 2- and 2½-ton sizes are much in favor, though there is a real demand for a 1-ton truck to work in co-operation with the heavier sizes, handling the loads which do not prove productive to the larger unit.

There is decided tendency among the contract haulers toward the better type of trucks, as they have found, in some sections particularly, that the cheaper trucks do not stand the gaff. This has been true in sections off the main highways, where loads are hauled over rough roads. And I noticed that they were, as a rule, using heavy trucks on which prompt service as to repairs and parts could be had. A break down of a truck which had no service station to fall back on, during the height of a hauling season, would be too great a loss for these men to stand and they are careful to keep this in mind in buying.

The universal body in most ranching districts is the platform and the stake, adapted to handling sacked, crated or baled produce.

#### Motor Stages

In the development and extension of motor stage lines, California stands without a rival among the states. One of the

A typical instance of the wisdom of the railroad commission in dealing with the motor stages is shown in a very recent decision, whereby the commission refused to grant a license to another stage to be operated between Montague, on the main line of the Southern Pacific Railway in the extreme northern part of the state, and Yreka, a little town a few miles west, and connected with the S. P. by the Yreka Railroad. In handing down its decision refusing the new company its license, the commission stated that already there is maintained so efficient a motor freight and passenger service between the two towns that three-fourths of the business of the Yreka Railroad has been lost to the motor transportation companies.

It is needless to state that when a motor stage is given a license to operate, its continuance on the route depends entirely upon keeping up the best of service on a regular schedule outlined by the commission, and charging only the regular tariffs allowed by law.

Other states might well assist in the development of motor stage lines by copying California's excellent state supervision and regulation, which has assisted materially in making these lines a profitable

14, Fresno 45, Oakland 28, Sacramento 30, Monterey 13, and San Diego 26.

Motor stages have made possible the building up of towns isolated from the railroads, and that the stage lines will expand and grow in number and in importance in future years is assured. There is a good market for motor trucks of the right type in this field.

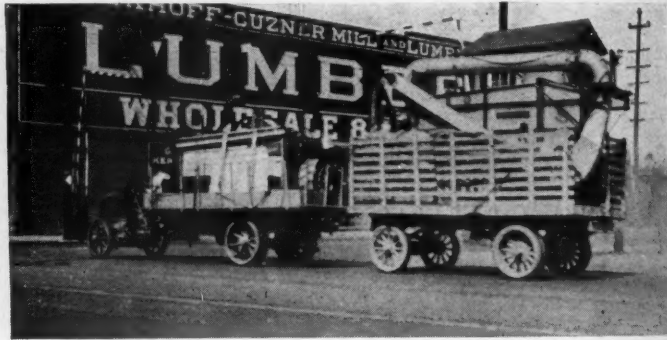
#### Motor Express Routes

Motor truck express service, covering regular routes on schedule, and serving a constantly growing clientele, has become a big factor in California's commercial and rural life. This activity centers in Los Angeles, with 69 different routes radiating in all directions from the city and entering practically every town and city from Bakersfield to San Diego. All through California, Wherever there is important exchange of merchandise between points, there are motor express lines to handle the business. All these lines, of course, are under the supervision of the state railroad commission, the same as the passenger stages, and must conform to certain rules as to schedules, rates, etc.

In Los Angeles many of the companies are now being brought under one head,



Many Loads of Watermelons Are Truckported From the Imperial Valley to the Market



Typical Rural Express Shipment Out of Los Angeles, a Complete Tractor and Threshing Outfit

big reasons for this is that within her borders are 796 towns with a total population of 89,000 whose only connection with railway service is by highways. And, naturally, the transportation of passengers and freight to and from these cities to the railways is now done mostly by motor truck.

The excellence of California's highways is a big factor in the development of her stage lines, also, for the average passenger likes to ride smoothly by stage the same as by railway coach. These roads also make possible the utmost in speed and in efficient and economical operation of the motor stages, and when to this is added intelligent and wise supervision by the state railroad commission, it is easy to understand why motor stages have made such progress in the Golden State. Every stage line must secure a license from the railroad commission before it begins operation, and must show that there is a demand for this type of transportation before the license is issued. The commission is extremely careful not to license too many stages over the same route, with the result that only a sufficient number operate to care for the business, and all therefore make good money.

business investment, rather than a precarious means of intermittent income.

There are at present something like 1500 motor stage lines in California, operating from single stages to entire fleets. Many of these lines, centering in the larger cities, maintain an organization similar to that of a first-class railway, with their own head offices, depots, traffic and passenger departments, garages and complete repair plants, etc.

From the first touring type of passenger cars used in the stage business, the California motor stage has been developed till today there are many vehicles in this work almost luxurious in their appointments. The lengthened passenger car chassis is gradually giving way to motor trucks of standard make, ranging from 2½ tons in capacity, on which are mounted specially built stage bodies. These have cross seats, with deep cushions, and everything possible to make the passengers comfortable.

Some idea of the way stage lines have grown may be understood when it is stated that Los Angeles has 48 different lines centering in its business section and running to practically every city roundabout; San Jose has 31, San Francisco

for better operation, and the change is working toward the betterment of the business generally.

Most of the lines run over comparatively short hauls, but it is significant that only a short time ago application was made for a license to run a regular express service by motor truck between Los Angeles and San Francisco, a distance of several hundred miles. The applicants based their claim for a license on the fact that the railroads are not meeting the transportation requirements between the two cities. It may be well to state that motor stage service has been very successfully maintained between the two cities for a number of years.

There seems no definite standard size of truck for motor freighting in California, the size of the truck usually being governed by the character of loads, type of roads, grades, etc. Trucks of 2½ and 3½-ton capacity predominate, though many 5-ton trucks with trailers are used. Only the larger trucks can make a profit on the long hauls. Trailers are used very generally in Southern California, for the splendid roads and easy grades on many of the routes make their use very economical. Trailer manufacturers have found



one of their best outlets in Southern California, as all manner of trucks in commercial work use them profitably.

While not coming directly under the head of motor express, as they run on no regular schedule, the hay and grain haulers of the Los Angeles district are worth mentioning here. The service from the Antelope Valley, from Paris Valley, Artesia, Hemet and other points within a radius of 100 miles of Los Angeles, is almost equal to express service, and loads of baled hay totaling ten to twelve tons, divided between truck and trailer, are a very common sight rolling into the city. At the hay market near North Alameda and Macy Sts., a half dozen or more of these outfits may often be seen, just arrived from as many different points.

These men are using the best trucks they can buy, as only first-class jobs will stand the tremendous overload they constantly haul.

#### Miscellaneous Truck Users

In some parts of California dairying is carried on extensively and motor trucks are used almost without exception in handling the milk and cream to condenseries, creameries or railroads. There is a growing demand for trucks in this work, of approximately 2-ton size.

Los Angeles and San Francisco are the two big metropolitan users of trucks and in the former city the 2-ton unit is the big seller with dealers. Constantly growing manufacturing interests in both Los Angeles and San Francisco are using more trucks every year, and there is every indication that Los Angeles, particularly, is on the eve of becoming one of the great manufacturing cities of the entire west. The starting of the immense Good-year tire plant has awakened the city to what can be done in manufacturing and already many other companies are contemplating plants near the city.

San Francisco's shipping has long used many trucks and in the past year or two the type with very low rear axle, bringing the platform very close to the street, has come into considerable favor.

Mining companies use a considerable number of trucks in California and these are usually of the 2½- to 3½-ton type. They are used principally in hauling supplies and occasionally some ore is hauled away from mining operations by trucks, where railways are too expensive to build.

The mule skimmers of the famous "20-mule team" borax companies in Death Valley have turned truck drivers, and today the truck rolls over the desert from the borax mines where formerly the mules plodded their weary way.

The 3½-ton heavy-duty truck has been the prevailing type on good road work in California, but owners have invariably insisted upon mounting dump bodies on these chassis equal to the size used on the average 5-ton truck. There seem to be in all lines of activity in California a determined purpose to overload motor trucks at least 100 per cent, and sometimes even more than this. Quick deterioration is the inevitable result, but owners don't seem to mind that. There is opportunity for much education of owners.

The distribution of trucks in the California district, which includes Nevada

and Arizona, is handled by the larger manufacturers through distributors having exclusive rights in these territories, or by factory branches with headquarters in Los Angeles and San Francisco. Almost without exception, distributors act in the same capacity for the best lines of passenger cars, for the exclusive truck distributor or dealer is a rarity on the Pacific coast. Their truck departments are separate and under a department manager, and it is doubtful if they could be run much more efficiently if they were an exclusive business. These few big distributors maintain establishments quite as efficient as any in the east, and are up to the minute in their selling methods, their service policies, etc.

They have absorbed the best dealers in the smaller cities and towns, usually placing their line with a leading passenger car dealer who handles the trucks in a separate department. These distributors, as a rule, will not take on a dealer unless he is financially able to handle the truck and knows something of merchandising methods. Needless to state, the number of this type of good dealers in the smaller cities is very small indeed, and there remains a very poor selection for the truck manufacturer who is seeking to introduce his trucks to the California market.

Many an eastern manufacturer has named supposedly good sub-dealers, even in the large cities, who started out with a rush, and the orders that began to come in looked good to the sales manager. And altogether too often has come shortly the inevitable crash, brought about by inexperience, poor selling methods, bad trade-ins, long time payments and all the evils that a dealer knows will bring failure.

The result is a black eye for the truck, of course, that takes a long time to recover from. The ill will of other dealers who are trying to do business on a sound basis is incurred, and the expense of establishing another dealer must be again undertaken. This has happened so many times in the larger coast cities that it has had a very appreciable effect on motor truck sales.

It would seem to me that the motor truck manufacturer who hopes to succeed in California business should be very careful indeed as to the responsibility of the distributor and dealer representing his factory out there, for a slow but certain development in that territory means really

big business eventually, whereas the sporadic up and down selling, with a new dealer every few months, leads inevitably to the truck getting a bad name in the state.

Dealer education should be carried on all the time, intensively, by all the companies, for even the best of the small town dealers are far from what they should be. Sales methods, service, financing, accounting; all should be watched carefully and dealers should be coached and helped in every possible way.

While a few of the smaller dealers know something of the modern selling of transportation, most of them have no eye further than the profits from month to month and have little vision of the future of the truck in California, or the part they might play in its development. Service is crude and sub-dealers rely greatly on Los Angeles and San Francisco for parts.

During the past year, when factories have been constantly oversold, Pacific coast deliveries have been slighted and many a distributor and dealer who might have made a "clean up" has had to be content with occasional deliveries from the east.

Transportation difficulties between the east and west have added to this grief materially.

I firmly believe that one of the best business investments an eastern motor truck manufacturer seeking to increase his business in California can make, is to send one or two of his most important executives on a personal tour of the state, so that they could get first hand information of conditions and see for themselves the possibilities for the future, and the methods that must be pursued to win permanent success in the field. A field man's report is good so far as it goes, but I know of no sales territory where "seeing is believing" applies more than in the Golden State.

#### Arizona

One of the best informed motor truck dealers in Phoenix told me that Arizona would absorb about 1200 motor trucks in 1921. There is one specialized line of truck buyers in Arizona, the sale being well distributed among the mines, stock raisers, ranchers, heavy freighters, stages, etc. Sizes from 1 ton to 3½ tons are considered by most dealers as the standard types for future sale, although some of the mining companies are using 5-ton



On the Way to Arizona Mines, With Machinery and Forage Supplies

sizes in small numbers. The asbestos mines are using 1½-ton sizes, with pneumatic tires, most exclusively.

Arizona dealers are selling mostly under contracts from California distributors, and while the more important carry a good supply of repair parts, the greater number rely on quick service on parts from Los Angeles.

The motor stage and motor freighter have been the means of opening much territory in Arizona, which is not over blessed with railroads, and some good

sized towns rely exclusively on motor transportation for all supplies. This business is growing constantly, as is the hauling of mine and ranch supplies from the main railroad towns to the hinterland.

Between 150,000 and 200,000 acres of Salt River irrigated land, near Phoenix, was planted to Pima (pronounced Pee-ma), long staple cotton this year, as against 10,000 acres in 1917. Last year's crop, from 90,000 acres, was 40,000 bales, bringing \$20,000,000 in the market. While trucks have not as yet

entered greatly into hauling of cotton, the future of the truck in this industry will be tremendous, for the cotton crop is destined ultimately to be handled by tractors in the field and trucks on roads.

The cotton districts near Yuma, and the new fields in the Santa Cruz Valley, near Tucson, are growing fast and will use trucks in large numbers eventually.

Irrigating ditches are the motor truck's greatest ally in California and Arizona. The trucks invariably follow the coming of the irrigation water.

## Dunlop Tire & Rubber Company

Rapid progress in construction of the factory of the Dunlop Tire & Rubber Company is being made at Buffalo, N. Y.

The plant has nine separate manufacturing buildings, each 560 feet long, mammoth warehouse, and a number of temporary buildings. Ground was first broken on March 16th, the first concrete poured April 7th, the first steel erected April 26th, the steel work complete and buildings roofed on August 1st.

When complete the buildings now under construction and immediately proposed, will represent thirty acres of floor space or about one and one-quarter million square feet distributed over approximately forty acres of the 214-acre tract purchased by the Dunlop Tire & Rubber Company. The company will not manufacture fabric tires but will devote the entire plant to Dunlop cord tires.

It is somewhat early to speak definitely of production. The estimated capacity of the plant is 12,500 tires daily, including both solid and giant pneumatics for trucks, passenger car tires (all cords) in both the large and small sizes, including Fords, and motorcycle tires. This volume can easily be doubled without by any means doubling the floor space.

The property is admirably located, having frontage on the Niagara River as well as direct rail communication to all parts of the country. It is ample in extent to provide for future expansion and this possibility is also assured by the construction plans, which are both original and interesting.

The plan involves an arrangement of groups, each of three parallel buildings 560 x 120 feet so located and spaced that the capacity can be doubled without the building activities interfering with operation of the original units. The groups of buildings are located on the opposite sides of a covered roadway upon which all materials will be transferred in manufacture, and the finished product to the giant four-story warehouse 546 x 162 feet.

A complete system of covered roadways will provide protection and free circulation of employees as well as transfer of materials and product without interference or congestion. A system of conduits or subways will carry to all buildings the water, pipes steam pipes and power to be supplied from Niagara Falls and the steam plant of the Buffalo General Electric Company.

The Company has provided for production of cord fabric by purchase of a tex-

tile mill already in operation at Utica, New York. It is expected that production will be fairly under way very early in 1921.

## St. Louis Truck Law Too Severe

Eighteen St. Louis truck drivers were arrested in East St. Louis, Illinois, recently, in one day, charged with violation of the Illinois motor vehicle law in overloading their trucks. These arrests followed a letter from the County Board of Supervisors, St. Clair County, calling the attention of the Chief of Police to the fact that this law was constantly violated by trucks operating out of St. Louis.

That the Illinois law which governs the weight carried by trucks per inch of tire bearing surface is either too severe or else it is interpreted wrong by the Illinois officials goes without saying, for the reason that according to the East St. Louisians there is not a truck now being manufactured in this county that can carry their full capacity loads over Illinois roads on the present size tires used by the various truck manufacturers on their products.

As this law has caused no end of hardships to trucking firms of St. Louis, who have registered numerous complaints without avail, the Commercial Car Bureau of the St. Louis Automobile Manufacturers' and Dealers' Association along with the Team and Truck Owners' Association will probably take these cases in hand and carry them to the highest court in Illinois, in order to get a correct interpretation of the law, or else have it killed, and a new one put into effect that will fully take care of the overloading problem to all concerned.

## Emergency Truck Registration

The Georgia Motor Truck Protective Association announces the registration in that state of two thousand trucks by their owners for public service in case of emergency. This association was formed two months ago at Macon, when the strike of the railroad clerks threatened to tie up transportation. The sole object of the association is to take care of any such emergency that may arise in the future. An enrollment of 5000 is confidently expected. Arrangements have been made to keep up the supply of fuel oil throughout the state, without the aid of railroads, in case of an emergency.

## Highway Improvement Will Go on

WASHINGTON, July 25.—There is to be no let-up in the nation-wide movement to bring the highway into its logical position as an efficient factor in transportation. This is the determination of the Federal Highway Council, in co-operation with Chambers of Commerce, and many other similar organizations. Men whose abilities have national scope are working with the council. Exhaustive studies of the short haul, terminal problems, conditions in new territory, surveys, motor truck terminal work, door-to-door delivery, statistics of costs, rates, etc., and an investigation into the reduction cost per ton mile through the use of trailers will be made.

J. H. Collins, manager of the Research Bureau, of the Chilton Company, Philadelphia, and formerly of the Bureau of Markets, U. S. Department of Agriculture, is chairman of the Committee on the Rural Motor Express. This committee will study franchises, insurance, uniform receipts and bills of lading, marketing, return loads, and the present status and development of machinery for putting the rural motor express into actual operation.

The general policy of the Transportation Committee of the Federal Highway Council is under the direct charge of Charles W. Reid, formerly executive officer of the United States Council of National Defense. It may be stated as follows:

"To assist in co-ordinating highway transportation with the other transportation agencies of the country; to encourage the development of highways that will advance the economic life of the nation; stimulate their use in such a manner as to facilitate and cheapen the transportation of food, raw materials and finished products, and co-operate with Government agencies, both State and National, to the end that our highways may be of maximum service in the transportation system of the country. To recognize the problems of the road builder, the needs of the roads' user, to visualize future highway transportation requirements, to co-operate with the railroads, waterways, and other agencies of transportation to the end that the public may enjoy that form of transportation which is most efficient, economical and practical.





# EDITORIALS



## Chassis Not Fully Equipped

**W**ITH motor truck manufacturers being so busy trying to meet the demand for trucks, a condition has arisen which needs looking into, especially if the best interests of the owner are to be considered. There are quite a number of trucks inadequately equipped that are being shipped out from factories. The fact that motor trucks are used in approximately two thousand different classes of business makes it impossible to furnish standard equipment which will be adequate for every purpose, as, for instance, the body equipment. Standard bodies can be used in the majority of cases, and these bodies are a great help to the dealer in selling his chassis.

However, in the matter of accessories, not enough attention is paid to this subject by the truck builder. The manufacturers, as a whole, do not put enough equipment on their chassis. Consequently, the owner is forced to go outside and purchase a number of accessories which in all probability were never intended for the truck on which he uses them. One concern, in commenting on this situation, reports that they met with some rather bitter experience with a number of different accessories, which they were forced to place on their trucks, and which were never intended for that particular make of truck, regardless of the fact that they were recommended by the manufacturer, or at least by the company from which they were purchased.

## Insufficient Postage on Foreign Mail

**I**F there is one thing that is annoying to the average business man, it is receiving mail upon which there is insufficient postage. This may happen occasionally to anyone who is receiving a great deal of mail matter and the matter is overlooked. However, it is a different case when it comes to sending out foreign mail. The American two-cent stamp will not carry mail all over the world. We are in receipt of a batch of envelopes, mailed to an import and export house in Japan, upon which insufficient postage was placed. This merchant informs us that he repeatedly advised the American firms that foreign postage was necessary, but no attention was paid to his request.

It is not so much the amount of the tax which the recipient has to pay that annoys, but the lack of

consideration that is shown by the firm that allows its correspondence to leave its offices in such a manner. It makes the recipient wonder if such carelessness is carried right through all of the concern's business dealings. Any motor truck or parts manufacturer who is doing export business certainly cannot afford to be careless in such matters.

## A Big Market for Farm Trucks

**W**ITH only about 14,000,000 men actually tilling the soil so as to produce food for about 110,000,000 people, it is a sure bet that the continuance of this condition will not help to bring down the cost of food prices. Furthermore, unless more people return to the farms the farmer will be forced to increase his cost of production. But additional labor will not alone solve the farmer's problems. What he needs most of all is efficient transportation.

Elsewhere in this issue we print the results of a survey made of the farm market by the Goodyear Co. This investigation shows that there is a potential market for 800,000 trucks, and this is in the farm field alone. With such conditions confronting the dealer we certainly cannot see why there need be any cause for alarm over the future of the motor truck industry. The farm market is one which cannot, however, be sold by waiting for the farmer to call on the dealer. The farmer is a busy man these days, especially when he hasn't enough help. The salesman must meet the farmer more than half way. He must go out with his truck and help the farmer load up, and run the goods to market. One such real demonstration will do more to sell the farmer than all the circulars and printed matter that the farmer could read in a lifetime.

However, it must not be taken for granted that every farmer needs a demonstration. In many cases the farmer is forced to buy simply because he cannot hope to compete with his neighbor or the surrounding farmers unless he has some way in which to get his products to market simultaneously with the other fellows. Everything must be done to sell the farmers motor trucks, so that nothing will stand in the way of getting his products to market. Otherwise his buying power will be reduced, and when his buying power is curtailed, every business is affected.

# News of the Trade in Brief

(For Factory Items, Personals, New Incorporations, Etc., See Pages 102-108)

## "Trucktown" the Feature of Wisconsin's State Fair

"Trucktown" will occupy a five-acre site close to the passenger car building of the Wisconsin State Fair, Milwaukee. The plan means the best possible demonstration to farmers, and the idea is believed to be entirely new. The five acres will be laid out as an ideal village, under organized government, with a mayor, police, and a fire department, street commissioner, etc. The "town" will have its motor trucks, general haulage tractors, trailers, and other farm power apparatus. There will be streets, sidewalks and lots, the latter used for exhibitions. A motor bus line will operate from the main gate of the Fair Grounds to the village, and will be a demonstration of efficient transportation methods for small communities that are without electric car lines. At one end of the village will be a demonstration ring, which will be used for loading and unloading demonstrations, exhibitions of hoists and loaders, the removal of empty bodies, and the placing of loaded bodies upon the chassis; comparison between loads of horse-drawn and motor vehicles, besides a number of

other demonstration features. Beside the ring will be a black tent for motion picture presentations.

## Non-Skid Tests

SAN FRANCISCO, August 10.—Practically all the big tire manufacturing companies will participate in the non-skid tests that are to form an important feature of the Safety-First Exposition, August 23 to 27, according to Manager C. De Witt De Mar. This exposition will be held in conjunction with the great Traffic Officers' Convention in San Francisco Exposition Auditorium, scene of the recent Democratic convention.

Of peculiar interest will be the complete working model of the new Fifth Avenue Signal System, which the New York police department delegation is to bring West with them. New York will be represented by probably the largest official delegation at the Traffic Officers' Convention, and their exposition of the new methods for regulating New York City traffic by means of signalling towers will be of special interest in view of the proposal to adopt the same system in the downtown district of San Francisco, and other cities.

## Two New Commercial Car Associations

At the convention of the National Team and Motor Truck Owners' Association, recently held in Chicago, two new national motor truck organizations were formed—The National Association of Commercial Haulers and The Motor Truck Association of America. The haulers' association includes only those truck owners who sell transportation as a business, but all owners of motor trucks, no matter what the business, are eligible to the Motor Truck Association of America.

The Haulers' Association, C. R. Collins, with offices in Los Angeles, secretary, is not affiliated with the National Team Owners' Association. It will devote itself to the problems of commercial haulers.

The object of the Motor Truck Association is to nationally stabilize rates and methods. T. D. Pratt, secretary of the Motor Truck Association of America; E. D. Fleming, secretary of the Pennsylvania Motor Truck Owners' Protective Association, and Tom Snyder, secretary of the Indianapolis Highway Transport and Terminal Association, joined interests in

## Coming Events

August 20 to 28, 1920—Springfield, Ill. Sixty-eighth Annual State Fair. Passenger Cars, Trucks, Tractors. B. M. Davison, Sec'y.  
 August 23 to 27, 1920—San Francisco, Calif. National Traffic Officers' Safety First Exposition, Auditorium. C. De Witt De Mar, Mgr.  
 August 23 to 28, 1920—Erie, Pa. Fifth Annual Erie Exposition. Passenger Cars, Trucks, Tractors. C. R. Cummins, Sec'y.  
 August 23 to 28, 1920—Stillwater, Okla. Oklahoma Farm Power Show. Direction State Board of Agriculture.  
 August 25 to September 3, 1920—Des Moines, Iowa. Fall Auto Show at State Fair.  
 August 28 to September 4, 1920—Sherbrooke, Quebec. Thirty-sixth Annual Great Eastern Exposition. Passenger Cars, Trucks, Tractors. Sidney E. Francis, Sec'y.  
 August 28 to September 4, 1920—Milwaukee, Wis. Fifty-fifth Annual State Fair. Passenger Cars, Trucks, Tractors. Oliver E. Remey, Sec'y.  
 August 28 to September 11, 1920—Toronto, Ont. Forty-second Annual Canadian National Exhibition. Passenger Cars, Trucks, Tractors, Accessories. John G. Kent, Mgr.  
 August 29 to September 4, 1920—Danville, Ill. Fourth Annual Eastern Illinois and Western Indiana Fair. Passenger Cars, Trucks, Tractors, Trailers, Light Plants, Farm Machinery. George M. McCray, Sec'y.  
 August 29 to September 4, 1920—Columbus, O. Seventieth Annual State Fair. Passenger Cars, Trucks, Tractors. Columbus Auto Show Co., Managers.  
 August 30 to September 4, 1920—Milwaukee, Wis. Annual Fall Show, auspices Milwaukee Automotive Dealers' Assn., Brumder Bldg. Passenger Cars, Trucks Tractors. Bart J. Ruddle, Mgr.  
 September 2 to 11, 1920—Quebec, Quebec Provincial Exposition. Passenger Cars, Trucks, Tractors. George Morisset, Sec'y.  
 September 4 to 11, 1920—Hamlin, Minn. Sixty-first Annual Fair. Passenger Cars, Trucks, Tractors. Thomas H. Canfield, Sec'y.  
 September 5 to 10—Lincoln, Nebraska. Fifty-second Annual State Fair. Passenger Cars, Trucks, Tractors. E. R. Danielson, Sec'y.  
 September 6 to 11, 1920—Rochester, N. Y. Thirtieth Annual Exposition. Passenger Cars, Trucks, Tractors. Edgar F. Edwards, Sec'y.  
 September 6 to 11, 1920—Wheeling, W. Va. Fortieth Annual State Fair. Bert H. Swartz, Sec'y.

September 6 to 11, 1920—Spokane, Wash. Twenty-seventh Annual Inter-State Fair. Passenger Cars, Trucks, Tractors. W. L. Tennant, Sec'y.  
 September 11 to 18, 1920—London, Ontario. Fifty-third Annual Fair, Western Fair Assn. Passenger Cars, Trucks Tractors. A. H. Hunt, Sec'y.  
 September 11 to 18, 1920—Vancouver, B. C., Canada. Eleventh Annual Vancouver Exhibition. Passenger Cars, Trucks, Tractors. H. S. Ralston, Sec'y.  
 September 13 to 14, 1920—Huron, S. D. Thirty-sixth Annual State Fair. Passenger Cars, Trucks, Tractors. C. N. McIlvaine, Sec'y.  
 September 13 to 18, 1920—Helena, Montana. Eighteenth Annual State Fair. Passenger Cars, Trucks, Tractors. Horace S. Ensign, Sec'y.  
 September 13 to 18, 1920—Syracuse, N. Y. Eightieth Annual State Fair. Passenger Cars, Trucks, Tractors. J. Dan Ackerman, Jr., Sec'y.  
 September 14 to 17, 1920—Douglas, Wyo. Sixteenth Annual State Fair. Passenger Cars, Trucks, Tractors. E. Ewel, Sec'y.  
 September 17 to 25, 1920—Peoria, Ill. Tenth Annual National Implement & Vehicle Show. Passenger Cars, Trucks, Tractors. George H. Emory, Sec'y.  
 September 19 to 25, 1920—Sioux City, Iowa. Eighteenth Annual Inter-State Fair. Passenger Cars, Trucks, Tractors. Motor Trades Bureau, Sioux City, Mgrs.  
 September 20 to 26, 1920—Los Angeles, Cal. National Tractor & Implement Show of the West. Auspices Tractor & Implement Dealers' Assn. of California. Guy H. Hall, Mgr., 169 North Los Angeles St.  
 September 20 to 25, 1920—Allentown, Pa. Passenger Cars.  
 September 21 to 24, 1920—Billings, Mont. Fifth Midland Empire Fair. Passenger Cars, Trucks, Tractors. F. M. Lawrence, Sec'y.  
 September 21 to 24, 1920—La Crosse, Wis. Twenty-ninth Annual Inter-State Fair. Passenger Cars, Trucks, Tractors. C. S. Van Auken, Sec'y.

September 25 to October 2, 1920—Oklahoma City, Okla. Fourteenth Annual State Fair and Exposition. Passenger Cars, Trucks, Tractors. R. T. Hemphill, Sec'y.  
 September 25 to October 2, 1920—Memphis, Tenn. Thirtieth Annual Tri-State Fair. Passenger Cars, Trucks, Tractors. Frank D. Fuller, Sec'y.  
 September 27 to October 1, 1920—Trenton, N. J. Thirty-third Annual Inter-State Fair. Passenger Cars, Trucks, Tractors. M. R. Margerum, Sec'y.  
 September 28 to October 1, 1920—White River Junction, Vermont. Fourteenth Annual State Fair. Passenger Cars, Trucks, Tractors. F. L. Davis, Sec'y.  
 September 27 to October 2, 1920—New Westminster, B. C., Canada. Fifty-first Annual Provincial Exhibition. Passenger Cars, Trucks, Tractors. D. E. MacKenzie, Sec'y.  
 September 27 to October 2, 1920—Salem, Oregon. Fifty-ninth Annual State Fair. Passenger Cars, Trucks, Tractors. A. H. Lea, Sec'y.  
 October 2 to 9, 1920—Chattanooga, Tenn. Fourth Annual Inter-State Fair. Passenger Cars, Trucks, Tractors. J. R. Curtis, Sec'y.  
 October 4 to 9, 1920—Buffalo, N. Y. Closed Car Show, auspices Auto Dealers' Assn.  
 October 4 to 9, 1920—Muskogee, Okla. Fifth Annual Free State Fair. Passenger Cars, Trucks, Tractors. Miss Ethel Murray Simonds, Sec'y.  
 October 4 to 9, 1920—Salt Lake City, Utah. Forty-second Annual State Fair. Passenger Cars, Trucks, Tractors. D. W. Farratt, Mgr.  
 October 4 to 14, 1920—Richmond, Va. Fiftieth Annual State Fair. Passenger Cars, Trucks, Tractors. W. C. Saunders, Sec'y.  
 October 6 to 16, 1920—New York. New York Electrical Exposition, three floors, Grand Central Palace, includes Electric Passenger Cars, Trucks, Industrial Trucks, Batteries. George F. Parker, Mgr., 124 West 42nd St.  
 October 9 to 24, 1920—Dallas, Texas. Thirty-fourth Annual State Fair. Passenger Cars, Trucks, Tractors, Accessories. W. H. Stratton, Sec'y.  
 October 11 to 16, 1920—Meridian, Miss. Tenth Annual Mississippi-Alabama Fair. Passenger Cars, Trucks, Tractors. A. H. George, Sec'y.



October 16 to 26, 1920—Atlanta, Ga. Southeastern Fair Assn., Fifth Annual Fair. Atlanta Auto Assn., Managers of Show, 305 Connolly Bldg.

October 18 to 23, 1920—Jackson, Miss. Seventeenth Annual State Fair. Passenger Cars, Trucks, Tractors. Mabel L. Stire, Sec'y.

October 18 to 23, 1920—Raleigh, N. C. Fifty-ninth Annual State Fair. Passenger Cars, Trucks, Tractors. Joseph S. Pogue, Sec'y.

October 28 to November 6, 1920—Macon, Ga. Sixty-fifth Annual State Fair. Passenger Cars, Trucks, Tractors. Harry C. Roberts, Sec'y.

October 30 to November 14, 1920—Waco, Tex. Eleventh Annual Cotton Palace Exposition. Passenger Cars, Trucks, Tractors. S. N. Mayneld, Sec'y.

November 8 to 13, 1920—Phoenix, Arizona. Sixteenth Annual State Fair. Passenger Cars, Trucks, Tractors. Shirley Christy, Sec'y.

November 14 to 21, 1920—New York. Automobile Salon, Hotel Commodore, Auto Salon, Mgrs., 785 Fifth Ave., New York.

February 7 to 12, 1921—Columbus, Ohio. National Tractor Show, State Fair Grounds.

March 15, 1921—Fort Worth, Tex. Twenty-fourth Annual Southwestern Exposition & Fat Stock Show. Passenger Cars, Trucks, Tractors. M. Sansom, Jr., Sec'y.

## Conventions

Atlantic City, N. J., August 30, 1920—The Motor Truck Assn. of America.

Atlantic City, N. J., October 13 to 15, 1920—National Implement & Vehicle Assn., E. W. McCullough, Sec'y., 72 W. Adams St., Chicago, Ill.

Atlantic City, N. J., October 22 to 25, 1920—Twenty-seventh Annual Convention National Implement & Vehicle Assn., Traymore Hotel.

Chicago, Ill., September 1 to 3, 1920—Thirteenth Annual Convention of the National Gas Engine Association, Congress Hotel.

Chicago, Ill., October 11 to 13, 1920—National Association of Purchasing Agents.

Chicago, Ill., October 12 to 14, 1920—National Federation of Implement & Vehicle Dealers' Association. H. J. Hodge, Sec'y., Abilene, Kan. Sherman Hotel.

Cincinnati, Ohio, December 8 to 10, 1920—Ohio Automotive Trade Assn. E. J. Shoyer, Sec'y., 404 Central National Bank Bldg., Columbus, Ohio.

Cleveland, September 16 to 17, 1920—Credit Convention of the M. & A. M. A.

Greensboro, N. C., September 24 to 25, 1920—Second Annual Convention North and South Carolina Automotive Trades Assn.

Gulfport, Miss., October 6 to 7, 1920—Fourth Semi-Annual Convention, Louisiana-Mississippi Automotive Trades Assn.

Los Angeles, Calif., October, 1920—Southern Division, California Automobile Trade Association.

Minneapolis, Minn., January 11 to 13, 1921—Annual Convention of the Minnesota Implement Dealers' Association, West Hotel, C. I. Buxton, Sec'y., Owatonna, Minn.

San Francisco, Calif., August 23 to 27, 1920—National Traffic Officers' Convention and Safety-First Exposition.

San Francisco, Calif., August 23 to 24, 1920—Northern Division, California Automobile Trade Assn. R. W. Martland, Sec'y., Pacific Bldg., Oakland, Calif.

## FOREIGN EVENTS

Brussels, Belgium—December 10 to 19, 1920—First Post-War Show, Palais du Cinquantenaire, auspices Chambre Syndicale de l'Automobile.

London, England—September 4 to 25, 1920—Machine Tool and Engineering Exhibition, auspices Machine Tool Trade Assn., Inc., Olympia.

London, England—October 15 to 23, 1920—Commercial Vehicle Show. November—Passenger Car Show, Olympia.

Paris, France—October 1 to 6, 1920—Tractor Competition and Demonstration, auspices Ministry of Agriculture.

Sydney, Australia—January 7, 1921—Australian Motor Show.

order to form the national association, to include all motor truck users. The three organizations thus uniting have more than 1500 members, who either operate trucks, hire them, or use them, in business. The new association will operate under the charter of the Motor Truck Association of America, and the New York organization carrying that name for ten years, becomes a local affiliated body of the national one, and will be known as the Motor Truck Association of New York.

A meeting to elect permanent officers and adopt a constitution and by-laws will be held at Atlantic City on Monday, August 30.

## Ford Buys a Railroad, Coal Mine and Timber Tract

Henry Ford and his son, Edsel, have bought the Detroit, Toledo & Ironton Railroad, and four hundred thousand acres of untouched timber and mineral land in Upper Michigan.

This deal assures the Ford Motor Co. and also the city of Detroit an uninterrupted, non-confiscable coal supply. Further interruption of industries for lack of coal in Detroit will be obviated. The railroad employees will work on the Ford plan of wages, hours, housing, and certificate investment privileges. The new Ford gasoline railroad car will be put upon the road for passenger service. There are 454 miles of track, 155 miles of side tracks, 85 locomotives, 3200 freight cars, 27 passenger cars and four round-houses in Ohio. There are 2000 employees.

A closed body plant and sawmill will be located near Republic, Mich., and wooden parts will be shipped directly to the various Ford assembling plants, to save freight, and rehandling at Detroit. Every scientific encouragement will be given in forestry, for encouragement of second-growth timber.

The Banner Fork Coal Corporation, in Harlan county, Kentucky, has been purchased by the Ford Motor Co., of Detroit, for \$1,500,000.

## New Canadian Development

The sensational development of Canadian industries in pre-war days was a weak and toddling growth compared to the mighty strides the Dominion is making industrially today. From 1905 to 1915 the capital invested in Canadian factories increased more than 135 per cent, and the value of factory products advanced roughly from \$700,000,000 to \$1,400,000,000.

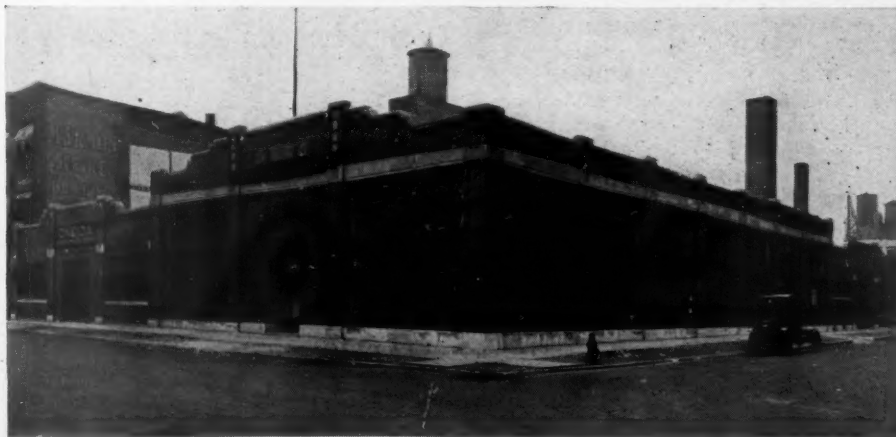
One of the most important recent announcements bearing on Canada's future industrial development is that of the Dominion Oxygen Company, Limited's promised erection of a chain of great oxygen plants for separating oxygen from the atmosphere. These plants will be situated in the Dominion's industrial centers, and service stations will be established throughout Canada to supply oxygen users wherever there is a demand for the gas, either on or off the railroads.

The first of these plants has already been completed at Toronto, and it is said to be the largest oxygen plant ever built in Canada. It will supply the Canadian market thru an extensive warehousing system, pending the erection of the additional plants. The sites for these additional plants have been secured at Montreal, Halifax, Winnipeg and Vancouver, so that the work of construction may be prosecuted as rapidly as possible.

In the matter of service the new company has made provision to create a standard in its field and will be prepared to fill its orders in one or one thousand cylinder lots within 24 hours, and where orders are received in the forenoon shipments will be made the same day. An ample supply of cylinders, all new and made in accordance with specifications approved by the Canadian Board of Railway Commissioners, has been provided in advance. These cylinders are of a special type and are said to be so constructed that they are both lighter and stronger than the old type cylinders, being designed to reduce the freight to the consumer without sacrificing but actually increasing the cylinder strength.

## Oneida's New Truck Building Covers Every Requirement

The new sales and service building of the Chicago-Oneida Truck Co., Wabash Avenue at 23rd Street, is unquestionably one of the finest exclusive truck sales and service buildings in the central west. The building which was erected especially for this company is ideally located for truck owners and operators on Wabash Ave. The tendency of the truck division of motor row is toward Wabash Avenue and the south, Chicago's great "truck highway."



Chicago-Oneida Truck Company's New Chicago Building

The building is one story, with a mezzanine or balcony. The first floor covers 30,000 floor feet and accommodates an elaborate sales room, a spacious and modern equipped service station, a large and well-arranged used truck department, a service parts and order parts department, receiving and shipping departments, a drivers' club room, and offices for the sales manager, service manager and chief inspector or service engineer. The balcony accommodates the financial department, the executive offices, information, sales department, etc.

The Oneida dealers, because of their greatly improved facilities in this exceptional new building, are able to install the highest type of service. The service department is in the hands of experts many of whom are factory-trained. An inspection department which maintains a constant record of all Oneida trucks in operation in the Chicago district, inspects them regularly and sees to it that they operate with maximum profit and efficiency, is a feature of the new Oneida service.

A department of haulage analysts, whose services are free and who analyze conditions for truck operation, prepare costs of operation and upkeep data, and recommend the best equipment for the particular job to be done is also a Chicago-Oneida feature. This department is under the very capable direction of W. J. Burns, formerly in charge of the American Railway Express Company's Chicago fleet.

The order parts department will be most complete. The company has modeled its order parts department after the same department at the Oneida factory and will carry nearly as complete a stock as is maintained at the factory. The factory will supply its dealers within a radius of several hundred miles of Chicago from the Chicago department. This enables the Chicago-Oneida company to maintain factory service.

The building is impressive and out of the ordinary for exclusive truck buildings. Finished in mahogany and with all the fineness and appointments of a passenger car show room.

H. N. Leonard, president of the Chicago-Oneida Truck Company hit upon something entirely new when he innovated the "Drivers' Club Room" in his new sales and service building at Wabash Avenue and 23rd Street.

"To maintain the efficiency and the dispatch of our modern service department we made our service department, service engineers, order parts department and shipping departments absolutely private. When a driver brings in his truck for repairs, replacements or for inspection, the truck is admitted to the service department and the drivers to the club room. The club room is provided with comfortable chairs and reading matter and the drivers smoke and chat or read while our men make the necessary repairs or adjustments on their trucks. The drivers' club room keeps the orders parts and the repair departments in the big Oneida building positively private and mechanics are not disturbed by visitors or by parties asking questions or interfering with the quickest and most efficient work.

L. E. Wagner, for many years corporation sales manager for the Diamond T Motor Car Co., has been appointed sales manager for the Chicago-Oneida company.

### New Members Elected to M. and A. M. A.

Recent additions to membership in the Motor and Accessory Manufacturers' Association:

The Adams Axle Co., 433 W. Main Cross St., Findlay, Ohio. Passenger car, truck, tractor and trailer axles.

Asch & Co., Inc., 16-24 West 61st St., New York. Flower vases, belt hinges, locking devices, etc.

Atlas Crucible Steel Co., Howard Ave., Dunkirk, N. Y. Carbon and alloy steel.

Duplex Rim Device Co., 7546-48 South Chicago Ave., Chicago, Ill. Rim devices and other accessories.

Kalamazoo Spring & Axle Co., 401 Portage St., Kalamazoo, Mich. Flat leaf automobile, carriage, wagon, motor cycle and bumper springs.

Kelso Manufacturing Co., 58 Market St., Trenton, N. J. Asbestos brake lining and clutch facing.

The Miller Rubber Co., Akron, Ohio. Automobile tires, tubes, accessories and repair material.

Norton Company New Bond St., Worcester, Mass. Grinding wheels, machinery and abrasive materials.

Rome Wire Co., Clyde Ave., Buffalo, N. Y. Automobile lighting, starting and ignition cables.

The Russell Mfg. Co., Middletown, Conn. Brake linings, woven and fibre clutch facings, fan belts, web straps, top webbings, hood and radiator lacings, anti-squeak webbing, belting.

The Tillotson Manufacturing Co., City Blvd. and M. C. R. R., Toledo, Ohio. Carburetors.

Westinghouse Union Battery Co., Swissvale, Pa. Lead storage batteries.

### Sends Letter to Banks Regarding Credit System

The Buda Company, of Harvey, Ill., has recently sent a letter to all banks in this territory for the purpose of easing the credit situation. Extracts follow:

"Based on our observations, there seems to be a growing tendency among the banks, especially the country banks, to curtail the credit of motor truck purchasers. This is in turn having its effect on the truck manufacturers, and through them on the parts manufacturers, of which this company is one. We believe this attitude is based largely, is not entirely, on a misconception of the importance of the truck to the economic life of the nation at the present time and under the present conditions.

The railroads which are operating under a very great strain need and will welcome immediate relief. It probably will be years before they are again in normal condition for handling traffic. Production is the crying need of the day. It alone will bring down the high cost of living. But production without transportation is of no real benefit to

anyone. Anything that can be done, therefore, to relieve the present strain on the railroads and to get the food stuffs to the railroads is essential to the country's welfare. Nothing can do this to the same extent as the motor truck, in so far as short hauls are concerned. This has been amply demonstrated during the past few months, especially at the height of the switchmen's strike, although, of course, the supply of trucks was entirely inadequate to meet the demand.

No one will ever intimate that the motor truck can successfully handle the heavy tonnage, long haul business. That is the function of the railroad and that is where the railroad makes its money. Motor trucks are a valuable aid to the railroads, however, on the short hauls and on terminal transfers as well as in bringing the food stuffs from the farm to shipping point. It is common knowledge that terminal facilities of the railroads are inadequate and anything that will lessen the traffic through congested terminals should and will be welcomed not only by the shipping and consuming public but by the railroads themselves.

A three-ton truck will haul practically as many tons and produce practically as many actual ton miles per day as the average forty-ton box car in L. C. L. merchandise service. The average merchandise car (not in peddler service) hauls probably not to exceed an average of seven tons, and travels an average of probably twenty-five miles per day, giving it an actual ton mileage of 175 per day. The so-called peddler car will not haul an average of more than four tons and produce an actual ton mileage of one hundred. A three-ton truck will travel on an average, the country over, probably forty-five miles per day and thus produce a ton mileage of say 135 per day, as compared with 100 ton miles for the peddler car and 175 for the merchandise car, other than in peddler service.

Every merchandise car, peddler car, or terminal transfer car that is released from this unprofitable short haul service can be put into profitable long haul service by the railroads, thus doing a great deal to relieve the traffic congestion. The possibilities here readily can be seen when it is understood that approximately 25 per cent of railroad freight cars are in merchandise service. The railroads today are suffering not only from car shortage but from lack of freight house labor. The situation in the latter respect is worse than it ever has been before. Motor truck delivery means store door delivery, thus eliminating the freight house labor problem as well as the drayage problems.

There are \$70,000,000,000 invested in farms in the United States and the annual production is from twelve to fourteen billion dollars—this representing only the portion saved. If only one-fifth of the amount now said to be wasted could be saved it would mean the addition of \$2,500,000,000 to our annual production.

One-half as much tonnage was hauled in 1918 by motor truck as by the rail-



roads. The percentage should be increased as the motor trucks have the use of 2,753,624 miles of highway (of which 296,290 are surfaced) as compared with 259,000 miles of railroad.

It is a fact that where there are good hard-surfaced roads the trucks handle practically all the merchandise business today. Fostering the truck industry will make this possible the country over and relieve the transportation systems so that they can perform their proper functions.

May we, therefore, ask that if you think well of the above you place it before your country correspondents with a view to the mutual betterment of all concerned. We are firmly convinced that there is no single industry today that can exert the same helpful influence in bringing down high prices and otherwise stabilizing conditions as the truck industry.

H. M. SLOAN, Treasurer.

### Detroit Products Company Increases Its Spring Out- put Facilities

The new motor spring shop, one of the new additions of the Detroit Steel Products Company, Detroit, Mich., at 2250 East Grand Boulevard, which are now nearing completion, will have a capacity of 1,920,000 springs a year, enough springs to equip 45,000 cars and trucks a month, or 540,000 vehicles a year. For several months the spring shop has been manufacturing 2000 tons, or more, of springs each month. When the new shop is opened the plant will be able to produce 3000 tons of springs a month.

A new forge shop and steel storage bins, 242 x 65 ft., are included in the additions to the plant. Steel will be unloaded directly from the cars, by means of 10-ton electric cranes that will transport the steel to the storage bins and to the forge shops. The storage bins will have storage space for 20,000 tons of steel.

The new forge shops will be equipped throughout with the latest designed spring making machinery, an example of which is their new spring forming machine that forms, quenches and hardens the leaf in a single operation. This machine makes an eight-leaf spring in each revolution, requiring about one minute, and greatly reduces the labor.

Besides manufacturing motor springs, this company also manufactures Fenestra Wind Walls, having one of the largest steel window fabricating shop in the world.

### Bruenauer is Vice-President

At the last meeting of the Board of Directors of the Chicago Standard Axle Company, Otto Bruenauer was elected vice-president and made general manager. This brings Mr. Bruenauer back into the parts business after a brief absence.

Mr. Bruenauer was identified with the bearing industry first with the Gurney Ball Bearing Company and later as di-

rector of sales and engineering of the U. S. Ball Bearing Company.

Upon the death of one of his associates, Mr. Bruenauer disposed of his interest in the ball bearing business to become affiliated with the All American Truck Co., of which company he was vice-president and acting general manager, until taking over his present interest in the Chicago Standard Axle Company.

One of the major appointments made by Mr. Bruenauer immediately upon taking active charge of the Chicago Standard Axle Co. was that of Everett J. Cook to the position of chief engineer. Mr. Cook was originally in the engineering department of the Packard Motor Car Company, from which company he became associated with the Engineering & Sales Corp., who were then selling Wisconsin Motor Parts Company at Oshkosh.

Coincidentally with this change in personnel the Chicago Standard Axle Company moved into its quarters at 1300 Fletcher St. This plant is a thoroughly modern one in every detail, with an ultimate capacity of 12,000 worm-drive axles per annum. At the present time three models, the one, one and a half and two-ton, are in production, and additional large size models on the boards.

Practically all the equipment necessary to bring the shop up to its ultimate production is either in hand or on order.

### New Addition to Heil Plant

The new addition which is being constructed at the Heil plant, Milwaukee, Wis., is 136 x 260 ft., which will make a total of approximately 150,000 sq. ft. for the total Heil plant. The new addition will contain two crane runways, one 40 ft. and one 50 ft., for 10-ton cranes. This will make a total of seven 10-ton cranes in operation here.

The new addition is to be used for a stock room and new machinery for cutting steel is being installed. Part of the space will be devoted to mounting truck bodies and Hydro Hoists and Compartment Truck Tanks. Also considerable space will be taken over in the production of gasoline storage tanks, the manufacturing of which this company is very actively engaged in.

### Federal Motor Truck Company Continuing Production at Full Schedule

The Federal Motor Truck Company is continuing on the greatest schedule in its history, laid out at the beginning of 1920, and has produced up to July 1st, in spite of switchmen's strikes and other delaying factors, more than its original schedule for six months. In spite of this, there has never been a time when the end of orders has even been within striking distance. The Federal Company has been far behind orders, both domestic and foreign, since April of last year. Further, not a man in the Federal factory has been laid off—new machinery is being placed, and a new building of 60,000 square feet area, which is badly needed, is being rushed to com-

pletion, to supplement the 250,000 feet now under roof and crowded with trucks in the process of manufacture.

The Federal Company is not only carrying the largest inventory in its history, but is constantly making large additions to it. This is necessary because of the greatly augmented production schedule undertaken because of the demand for trucks this year.

The whole country, and the world, is crying for greater tonnage moving. Last year there was moved by truck in the United States alone over six and one-half billion pounds. This would mean that every man, woman and child had moved for him ten pounds a distance of 12,000 miles, or 60 tons moved one mile for every person. This year it will be multiplied many times.

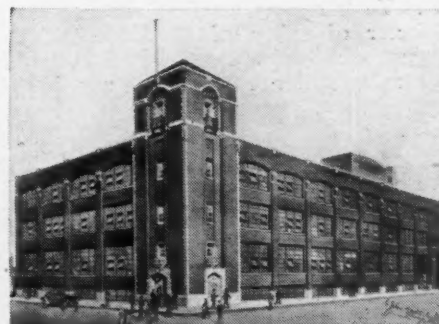
### Illinois Bus and Truck Lines

The Peoria, Ill., Star Bus Company has been incorporated and plans a line of motor busses and trucks between Peoria and Chillicothe, cities ten miles apart.

Benjamin Hyman, Kankakee, Ill., has organized a motor truck shipping company and will operate a fleet of heavy express and freight trucks between Kankakee and Chicago, including Danville, Watseka and other Northeastern Illinois points. Milk shipments will be specialized and the proposed completion in the autumn of the Dixie Highway pavemen between Chicago and Danville is the reason for the new line. The company is now in the market for truck equipment.

Thomas F. Fay, Rockford, Ill., owner of the Fay Motor Bus and Truck Company, has won his protest against the city council's insistence that he carry \$10,000 liability insurance. He offered to deposit one dollar each day for each vehicle operated, and from this fund meet all proven liability claims. He contended that forcing him to carry liability insurance was unfair, inasmuch as the street railway company, and other competing lines, were not required to assume such a financial burden.

The Lincoln Highway Association suffers a sad and heavy loss in the death of H. C. Ostermann, vice-president and field secretary, killed by his car skidding on wet grass on a night trip, while making his twenty-first transcontinental drive.



New Home of the Dallas Brass & Copper Company, 820 Orleans Street, Chicago, Illinois

# Wood Wheels for Motor Trucks Equipped With Pneumatic Tires\*

This Article Gives Some Practical Information Regarding the Design and Construction of Wood Wheels and the Correct Size of Wheel to Use With the Large Pneumatics

By CORNELIUS T. MYERS, M.E.

**T**HE rapid development of the pneumatic tire for motor truck service has concentrated the attention of motor truck engineers and manufacturers on the study of various chassis parts effected by the change of tire equipment from solid to pneumatic. While the design of the entire motor truck chassis will ultimately be more or less effected by this change in tire equipment, such component parts as the wheels, and the axles with their drive and brake mechanism, are due for immediate attention. Wheels and rear axles in particular need to be redesigned to better fit the operating conditions with pneumatic tires.

The manufacture of wood wheels for motor trucks is a specialty carried on by some fifteen or more plants which carry large supplies of fine hard woods in stock, and which are equipped with special machinery for turning out this product. Practically all the wood wheels used in the motor truck industry are fabricated by these wood wheel manufacturing plants, having a total capitalization of about \$35,000,000, and facilities for producing over 2,000,000 motor truck wheels per year.

Motor truck wheels have to withstand stresses from loads applied in three different ways:

- (a) Stresses due to radial loads (static and shock), acting thru the felloe and spokes to the axle hub, and approximately in the plane of the wheel.
- (b) Stresses due to propulsion or retardation of the motor truck, acting tangentially to the felloe and in the plane of the wheel.
- (c) Stresses due to side thrust or skidding, acting against the felloe and perpendicular to the plane of the wheel.

These stresses may exist separately and in various combinations. Long experience has confirmed suitable felloe and spoke sizes for trucks operating on solid tires. When the wheels are carefully made from properly seasoned wood we find that they will stand very heavy radial shocks and overloads mentioned under (a). Tests show that wood wheels have a factor of safety of 600% to 1000% against such loads. As the truck springs and axles will not withstand any such

overloads there is no danger of failure from radial loads. Road shock is absorbed by both the tire and by the spring, which greatly minimize the impact or shock loads that are the chief concern of the motor truck designer.

So far as the tangential stresses due to propulsion or retardation, mentioned under (b), are concerned, the average rear wheel will stand a great deal more than can be applied thru the drive shaft or brake drum. These stresses are limited by the adherence of the tire to the road surface. The writer does not know of a single case of wheel failure due to tangential stresses, the wheel being automatically protected by this limitation of adherence. When wood wheels are placed in a testing machine, tangential loads can be increased until the hub or axle fails before any stress is noted in the wheel.

By reason of their general design, wheels, whether they be wood or steel, are less liable to withstand stresses due to the side thrust of the vehicle, as mentioned under (c), than the radial or tangential loads (a) and (b). These side stresses, or skid loads, are then the critical ones to be considered in wheel design. It would not be difficult to build wood wheels that are much stronger in this respect than those in common use on trucks today, were this considered essential or desirable. So far as solid-tired trucks are concerned the proportions in which well made wood wheels are designed give eminently satisfactory service, many claims to the contrary, notwithstanding.

So far as wheels for pneumatic-tired trucks are concerned, the problem is, if anything, simpler than on the solid-tired truck, as road shocks are better cushioned by the pneumatic tire. This also applies to the side thrusts on the wheels, due to turing and to bouncing over rough roads. There is one condition, however, under which the side thrust on the wheel might be as great with pneumatic tires as with solid tires, and it might even be greater, due to greater speed at which the pneumatic-tired trucks will operate. This is the shock load when the truck skids and the wheel rim strikes the curb; altho trucks seems to skid less with pneumatic tires than with solid tires.

## Flexibility of the Wood Wheel

This shock will be transmitted to the wheel bearings, the axle housing and shaft, the springs, the spring hangers, frame and other parts, if not cushioned in some way. The tires, of course, do not absorb the terrific blow against the rim, neither will the springs be available for absorbing it, as they are designed to flex under a vertical impact, and do not cushion the side blow. Against these blows, then, the wheel must protect the other parts which

are more expensive and more difficult to replace; and it is through this function of protection that the wood wheel has served to the very great advantage of the automobile and motor truck industry.

Wood wheels act in two ways to protect a motor truck. In the first place, they are more or less flexible. They give under the dangerous side blows and act as springs to dissipate to a large extent these shocks, which must otherwise be taken metal to metal by bearings, axle shafts and housing, springs, hangers and frame.

In the second place, the wood wheel stands in the same relation to the other chassis parts as the fuse plug stands to the wiring and apparatus in an electric circuit, or as a cylinder-head stud stands in the cylinder and its parts in a locomotive. It will break under the excessive side load due to a bad skid, and in so doing, saves the other parts which are much more expensive and more difficult to repair. For the wood wheel is comparatively cheap and quite easy to replace. No one would think of wiring his house or factory and omit blow-out fuses; nor would any master mechanic accept a locomotive in which the cylinder-head studs were so strong that they would not be the first piece to break in case a slug of water were carried into the steam cylinder and caught between the advancing piston and the cylinder-head.

The two principles just mentioned—that of the cushioning of impact, and the use of an easily replaced weaker link for the protection of the principal mechanism, are universally recognized and practiced. The general public, however, has not appreciated how wood wheels have served them in these respects, though much wear on bearings has been averted and many a big repair bill has been avoided by the fact that an inexpensive wood wheel gradually gave way, and in so doing absorbed the energy of a blow that would otherwise have caused far greater damage. There has been a tendency on the part of the industry, when annoyed by wheel failures, to look for an indestructible wheel, disregarding for the moment the indispensable service which has been and is being rendered by the wood wheel in fulfilling the functions outlined above.

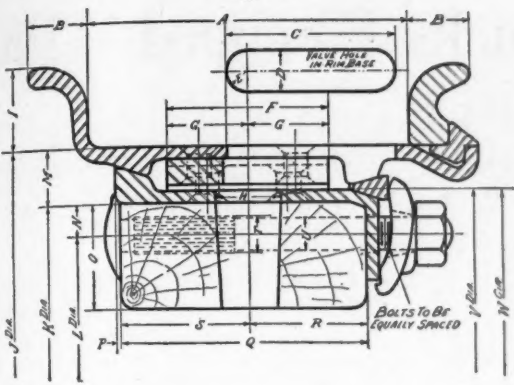
In buying wood wheels there are several things that are well worthy of attention on the part of the truck manufacturer. Contrary to popular opinion, his choice of hard woods to be used need not be limited to white oak and hickory. He can with safety also use for

Spokes—Red Oak, White Ash, and Rock Elm in all sizes; and Hard Maple and Birch in sizes 2" and larger.

\*Note: During the past two years quite a number of unsatisfactory wood wheels have been noted on motor trucks. This is due to the fact that, on account of war conditions, it was very difficult for wheel manufacturers to obtain seasoned lumber. The government had requisitioned large supplies which under ordinary conditions would have been available to the wheel manufacturers. The government also ordered large quantities of wheels, insisting upon prompt deliveries for emergency war use. Most truck manufacturers had to be content with accepting for their regular trade, wheels which perforce were made from improperly seasoned wood. Some wheel manufacturers refused to use this stock, but others did so after explaining the situation to the truck manufacturer. For this reason there are numbers of truck wheels in service today that are no criterion whatever of what a good wood wheel should be.



Fig. A.



For Tire Sizes Five, Six, Seven and Eight Inches. Refer to Table 1 for Dimensions

Felloes—Hard Maple, Red Oak, White Ash, Rock Elm and Birch, all sizes

if these woods are carefully selected, properly seasoned and kiln dried. For that matter, white oak and hickory must also be carefully conditioned to give satisfactory service. These woods have somewhat varying characteristics which must be allowed for in the conditioning process. Buyers should be particular to satisfy themselves that their sources of supply give due attention to this, just as they satisfy themselves on the heat treating, forging or similar methods by sources of supply for steel products. Truck engineers and manufacturers have not given as much attention to this as they have given to metal processes, especially the heat-treating or conditioning of steel. As a matter of fact, wood wheels have been so very satisfactory until the war temporarily upset the lumber market, that the truck engineer or manufacturer has not concerned himself much with the matter. Investigation and co-operation will hand-somely pay both the truck manufacturer and the wheel maker.

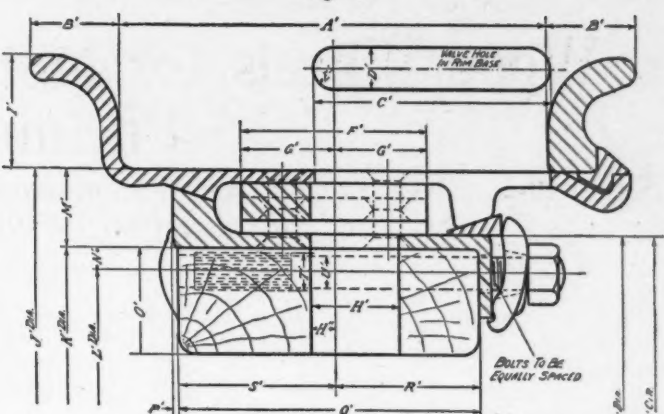
Wheels Must be Properly Painted

Wood for wheels is kiln dried until it contains 5% to 7% of moisture, based on what is known as the oven-dry weight of wood. It is then fabricated into wheels,

and the wood will swell. If later it is stored in a heated room or used in a very dry climate it will lose some of the moisture, shrink and become loose. Proper oiling and filling by the wheel maker, and at least two coats of good paint put on before the truck goes into service are essential to the life of the wheel and must not be overlooked. When, in addition, the truck owner gives the wheels their finishing coats of color paint and varnish, they are protected to give good service.

As to dimensions. The felloe sizes are determined by the pneumatic tire rims. These rims have been standardized as per Table 1, the wood felloe sizes being given in Columns O, Q, R, S of Tables 1 and 1-A. The spoke sizes must be chosen in connection with the felloe size, and must be heavy enough to carry the rated load of the pneumatic tire with a reasonable margin for overloads. This margin need not be as great as for wheels to take solid tires, for the pneumatic tire has a very small overload capacity and will not give good service if overloaded. This will tend to check the overloading evil where pneumatic tires are used. Table 2 gives the absolute maximum loads for the various tire sections as adopted in May, 1920, by the Tire & Rim Association of the United States. It also shows the rated load capacity of wheel on which the tires would be used.

Fig. B.



For Tire Sizes Nine and Ten Inches. Refer to Table 1-A for Dimensions

- 6. Minimum hub bore permitted by standard spoke billet.
- 7. Maximum diameter of flange permitted standard spoke billet.
- 8. Number and diameter of flange bolts.
- 9. Location of hub bolts.
- 10. Fit of hub in wheel bore.

There is no particular reason why a wheel for pneumatic tires should have the same number of spokes as a wheel for solid tires, except that it might take the same number of hub flange bolts. There are good reasons why fewer spokes can be used for pneumatic-tired wheels.

- (a) There is less overload to contend with.
- (b) The felloe diameter is smaller for same tonnage rating of truck because of the increased thickness of tire. This makes a shorter and stronger spoke.
- (c) With the smaller diameter of felloe fewer spokes can be used without unduly increasing the distance between the outer ends of adjacent spokes. This preserves to the wheel its radial flexibility.
- (d) There is more room between the spokes for the tire valve air connection.
- (e) The wheels are better looking.
- (f) The wheels are lighter in weight.
- (g) The wheels are easier to paint.

TABLE No. 2.

Tire size	Abs. max. load per tire in lbs.*	Inflation Press. in lbs.	No.	Spokes		Wheel Load Capacity in Pounds
				Thick-ness	Barrel Section	
34 x 4 1/2	1200	75	12	1 1/2"	1 1/2 x 1 1/2	1500
34 x 5	1700	80	12	1 3/4"	1 3/4 x 1 3/4	2000
36 x 6	2200	90	12	2"	2 x 2	2500
38 x 7	3000	100	12	2 1/4"	2 1/4 x 2	3400
40 x 8	4000	110	12	2 1/2"	2 1/2 x 2	4400
42 x 9	5000	120	12	2 3/4"	2 3/4 x 2	5300
44 x 10	6000	130	12	3"	3 x 2	6250

\* Cord tires for commercial vehicles.

precautions being taken that the wood is not unduly exposed to moisture until the wheel has been properly protected against it. When the truck manufacturer receives the wheels they should at once be given a coat of good paint, so as to further protect them against the absorption of the moisture until the wheel is assembled in the truck chassis. After the road test and before shipment the truck manufacturer should again paint the wheels. When improperly protected wheels are shipped and stored exposed to moist atmosphere, they will absorb moisture up to about 15%,

- In designing hubs for wood wheels the following points must be taken into consideration:
- 1. The radial load-rating of spokes.
  - 2. Number of spokes.
  - 3. Thickness of spokes between flanges.
  - 4. Spoke barrel section.
  - 5. Length of spoke between hub bore and outside diameter of flange.

Table No. 2 gives recommendations for items 1, 2, 3 and 4.

In designing hubs and flanges care should be taken that item 5, which equals half the difference between the flange diameter and the hub bore in the wheel, should be from 15% to 30% greater in length than the thickness of the spoke between the flanges, item 3. This insures the flanges a good grip on the spokes.

The minimum bore of the wheel (or the outside diameter of the hub where the ends of the spokes rest on it), and the maximum flange diameter are limits determined by the amount of material available in the standard spoke billet from which the particular spoke is made. Table No. 3 for given spoke thickness gives the minimum hub size and the maximum flange size.

The fit of the hub bore of the wheel over the hub should be neither a hard press fit or a loose one. It can be from a line and line fit to .020" loose fit. Wheels are seriously damaged when the bores are too small and the hubs are forced into them. This will often loosen the spokes at the mitre by forcing the spoke

wheels on account of the camber of the axle spindle, length of spoke, and side thrust in turning. The amount of dish should be about 2°.

TABLE No. 3

Tire Size	Spoke Thickness	No. Spokes	Min. Bore for Hubs	Max. Flange Diam.	Hub No.	Bolts Size	Spoke Symbol No.
34 x 4½	1½"	12	2½"	9	6	⅜"	1425-12
34 x 5	1¾"	12	2½"	9	12	⅜"	1626-12
36 x 6	2"	12	3	9½	12	⅜"	2026-12
38 x 7	2¼"	12	3	10½	12	⅜"	2230-12
40 x 8	2½"	12	3	10½	12	½"	2430-12
42 x 9	2¾"	12	4	11½	12	½"	2632-12
44 x 10	3"	12	3	11½	12	⅝"	3032-12

Note: Minimum bore and maximum flange diameters are controlled by standard rough spoke billets.

TABLE No. 1.

Size	34 x 5	36 x 6	38 x 7	40 x 8
A	3.750"	4.330"	5.00"	6.00"
B	.780"	1.00"	1.00"	1.25"
C	1-⅛"	2-⅛"	2-⅝"	3-¼"
D	⅝"	⅝"	⅝"	⅝"
E	⅞"	⅞"	⅞"	⅞"
F	1-⅜"	1-⅝"	2-⅜"	2-⅝"
G	1"	1"	1-¼"	1"
DIA. H	1.062"	1.265"	1.265"	1.500"
I	24"	24"	24"	24"
DIA. J.	22-⅜"	22-⅜"	22-⅜"	22"
DIA. K.	21-⅜"	21-⅜"	21-⅜"	21-⅜"
DIA. L.	⅞"	⅞"	⅞"	⅞"
M	⅜"	⅜"	⅜"	⅜"
N	1-⅝"	1-⅝"	1-⅝"	1-⅝"
O	⅞"	⅞"	⅞"	⅞"
P	2-⅜"	3-⅜"	3-⅝"	4-⅜"
Q	1-⅝"	1-⅝"	1-⅝"	2"
R	1-⅝"	1-⅝"	2-⅝"	2-⅝"
S	1⅞"	1⅞"	1⅞"	1⅞"
T	⅜"	⅜"	⅜"	⅜"
DIA. V.	22-⅜"	22-⅜"	22-⅜"	22-⅜"
CIR. W.	71-⅝"	71-⅝"	71-⅝"	70-⅝"
X	2-⅜"	2-⅜"	2-⅜"	2-⅜"
Y	⅜"	⅜"	⅜"	⅜"
Z.	8-⅜"	6-⅜"	6-⅜"	6-⅜"
No. of Bolts	8	10	10	10

Dimensions refer to Rim and Felloe cross-section, Fig. A.

TABLE No. 1-A

Size	42 x 9	44 x 10
A'	6.670"	7.330"
B'	1.370"	1.500"
C'	3-⅛"	4-⅜"
D'	⅝"	⅝"
E'	⅞"	⅞"
F'	2-⅝"	3-⅜"
G'	1-⅜"	1-⅝"
H'	1-⅜"	1-⅝"
I'	1.750"	2.000"
DIA. J'	24"	24"
DIA. K'	21-⅜"	21-⅜"
DIA. L'	20-⅜"	20-⅜"
M'	1-⅝"	1-⅝"
N'	1-⅝"	1-⅝"
O'	1-⅝"	1-⅝"
P'	⅜"	⅜"
Q'	4-⅜"	5-⅜"
R'	2-⅜"	2-⅜"
S'	2-⅜"	2-⅜"
T'	⅜"	⅜"
U'	⅜"	⅜"
DIA. V'	22"	21-⅜"
CIR. W'	69-⅜"	68-⅜"
X'	3"	3"
Y'	⅜"	⅜"
Z'	6-⅝"	6-⅝"
No. of Bolts	10	10

Dimensions refer to Rim and Felloe cross-section, Fig. B.

shoulder into the felloe; or it will force the end of the spoke tenon against the felloe band and seriously strain or split the spoke.

Dish of spokes is advisable for front

In the development of the motor truck industry the number of front and rear axle designs has become quite a large one. Each truck manufacturer which built its own axles used individual judgment and

preference as to wheel hub details for each size and type of axle. Manufacturers of axles for the motor truck trade have also followed individual preference as to these details, to a very large extent. In reviewing the situation today we find that it takes upward of 250 different wheels to cover the field of all the various axle hub designs and sizes for trucks having a total of ten load capacities, ranging from ¾ ton to 7½ ton. This covers wheels for solid tire equipment with the exception of those for the ¾-ton capacity truck. While it is quite natural that this condition should exist, due to the fact that the various designers of axle hubs worked independently of one another, and to the fact that the manufacturer of wood wheels obligingly conformed to all design variations, it is a condition that the motor truck industry can hardly view with complacency.

Now that practically all sizes of motor trucks are being equipped with pneumatic tires, it will mean nearly a 50% increase in the number of different wheels already in use. Standardization of hub design cannot fail to be of as great service as was the standardization of felloes and tire bands, for there are just as many hubs used as tire bands and rims. The discussion and data set forth herein are given in the hope that they may be of assistance to the industry in this respect.

## Motor Trucks Operate Pumps to Increase Oil Production

In order to assist the flow of oil and to stimulate oil production more wells are being operated by pumps today than ever before. Old wells may gain renewed productivity and the output of producing wells may be increased through the use of pumps to bring the oil to the surface. For pumps to operate effectively, however, it is necessary that the sand which accumulates in the wells be cleaned out at frequent intervals. If this is not done the sand will eventually work its way into the tubing and impair the efficiency of the sucker rods by means of which the oil is forced out of the well.

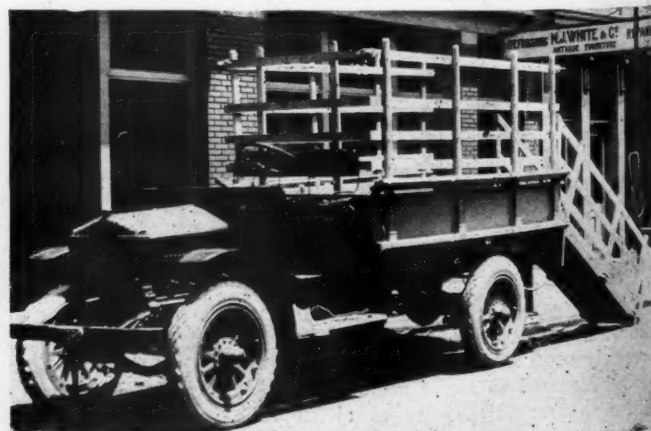
It has been the custom heretofore to have a stationary engine for the purpose of withdrawing the tubing and baling out the sand. This made the job of well-pulling very expensive because of the limited radius in which it was possible to use such equipment. Realizing the necessity of increased petroleum production the Mack-International Motor Corporation devised a portable well-pulling outfit which can be moved from well to well and thus

kept in constant use. An especially designed hoist has been mounted on a Mack chain-driven truck. The power for operation of the hoist is supplied by the truck engine. Such equipment is now being used successfully by the Shell Oil Company, of California, and by the General Petroleum Company. Not only do they find this apparatus useful because of the

facility with which it can go from one operation to another but also because the hoist can be removed and the chassis used for general transportation purposes. On one job near Taft, California, the truck first removed 1300 feet of tubing and then furnished power to operate the baler with which the sand that had stopped the oil flow was removed.

## Typical Live Stock Body for Trucks

Transportation of live stock by motor truck has been increasing with amazing rapidity, the farmers and stock growers of the country having learned that a material saving in cattle shrinkage is made possible by this mode of transportation. Consequently the live stock body for motor trucks has become very popular. The accompanying illustration shows a typical body of this kind mounted on a Garford 1¼-ton pneumatic-equipped truck. The owner has built a cleated runway to facilitate loading.





# NEW COMMERCIAL CARS



## The South Enters the Automotive Field With a New Orleans Truck

**W**HEN the New Orleans Motor Truck Mfg. Co. was organized and incorporated under the state laws of Louisiana, with an authorized capital of \$250,000, the activities of the automotive industry were extended to an almost virgin territory of the United States. The activities of the industry now take in the entire country from coast to coast and from Canada to the gulf. The city of New Orleans being the gateway for Southern export trade and the fact that it has river and railroad facilities at its command, and the close proximity of the plants of the South where raw materials can be secured at an advantage greatly lends not only to an ideal manufacturing center, but opens many potential sales opportunities, particularly exports to South America.

C. E. Patton, of Gary, Ind., prominent as a designer and builder of trucks, was elected president and also superintendent of the plant. Mr. Patton states that the agencies already established through several large cities in the South have placed enough orders to keep the factory busy for the next five months. He further says that in order to supply the demand the plant will be compelled to turn out five or ten trucks a day.

The board of directors are as follows: C. E. Patton, pres. and supt. of plant; H. Connecke, vice-pres.; V. O. Grasz, treas.; J. G. Cullen, C. J. Mazzeletti, and H. J. Manzella.

Production at the present time is being carried on in a modern daylight factory measuring 68 x 158 ft., besides which is

a vacant square of ground 200 x 200 ft., which provides ample room for expansion.

The New Orleans line of trucks at the present time consists of three models of 1½, 2½ and 3½ tons capacity. As the various units are greatly similar in these three models, varying only in dimensions in accordance to the respective capacities, a description of the 3½-ton model, which will herewith be given, will portray a general outline of the other two models. Specifications of the units of these other two models can be obtained in the specification columns of the COMMERCIAL CAR JOURNAL.

The engine of the 3½-ton New Orleans truck is of Hercules make. This 4-cylinder engine is cast in block with detachable head and has a bore and stroke of 4½ x 6 in., respectively. The lubrication system includes a pump, which operates off the camshaft. It forces oil through bored crankshaft to each main and connecting rod bearing, then by tube to wrist pin bearings. The engine is water cooled, water being circulated by a centrifugal circulating pump through the engine head and a large tube, Chicago radiator, having a capacity of 12 gal. The tubes of this radiator are of oval section, a feature that is said to greatly reduce the possibilities of bursting from freezing, as these tubes are claimed to expand when freezing. Ignition is through a high tension Eisemann or Splittdorf aero magneto with impulse starter. The carburetor is a Master or Zenith.

Power is transmitted from the engine through a multiple-disk, dry-plate Detlaff

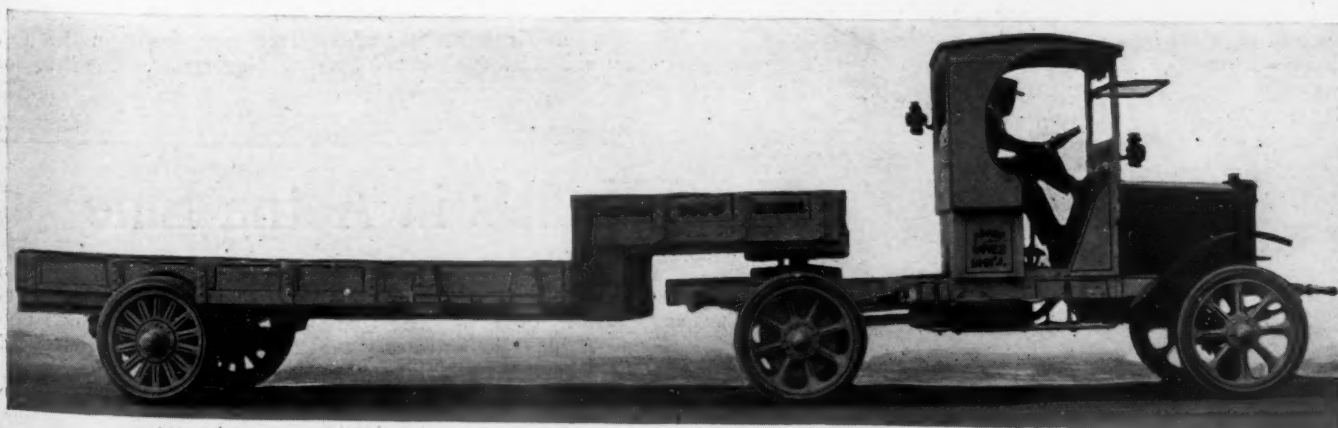
clutch to a constant mesh Cotta transmission, suspended amidships. This transmission provides three speeds forward and one reverse. Final drive is through a Wisconsin worm-gear, floating-type, rear-axle.

The make of steering gear employed in this truck is known as the Ross, semi-reversible. Its steering column is inclined to an angle making it comfortable for the driver, it is placed on the left-hand side of the truck with both control levers at the driver's right hand. The spark and levers are conveniently located on the top of the steering wheel.

The hot rolled, heat treated steel channel frame is 5 in. deep and weighs 7½ lb. to the foot. It is carried by four semi-elliptic springs measuring 3 in. wide, 44 in. long front, and 3½ in. wide, 56 in. long in the rear. The eyes are bronze bushed. Smith cast-steel wheels revolving on Timken roller bearings and equipped with 36 x 4½ front, and 36 x 4 duals rear, solid tires. Both the emergency and service brakes are of the internal expanding type, the foot brake expanding in a 20 in. drum and the hand brake in a 16 in. drum. The wheelbase is 166 in., tread 60 in., and its speed is controlled to 12 m.p.h. by a Duplex governor.

The entire equipment consists of driver's seat, side and tail oil lamps, horn, set of tools, jack and a bumper.

C. A. Shaler Co. in their suit against the Presto Patch Co., Phila., Pa., secured a decision holding as valid and infringed the patents of the Shaler 5-minute vulcanizers.



One of the Recently Announced New Orleans Models With Heavy-Duty Semi-Trailer Attached  
The New Orleans Motor Truck Mfg. Co. is at present producing a line of three models having the following capacities: 1½, 2½ and 3½ tons

## Parker Condenses Its Line to Three Models

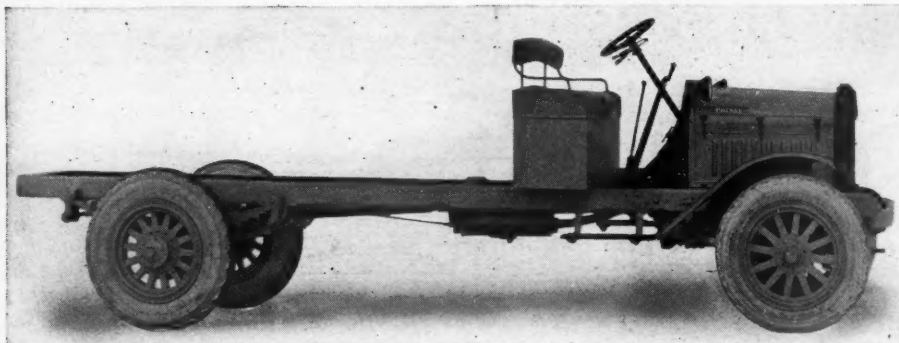
**T**HE Parker Motor Truck Co., Milwaukee, Wis., during the past eight years of motor truck manufacturing has been constantly seeking to standardize and minimize the number of models offered to consumers. At different times this company has placed on the market, 1½-, 2½-, 3-, 4- and 7-ton sizes and each of these models was

The Parker sectional frame cast radiator with staggered vertical tube core is mounted with ball and socket joints protecting it from vibration and frame distortion.

Power is transmitted from the engine through a multiple-disk Brown-Lipe clutch with all working parts enclosed, to a Warner transmission, which is of the

The specifications below of the 3½-ton model are in a general way a description of all Parker models, as many parts including service brake are interchangeable on the three models. The engine which is suspended from three points has a bore and stroke of 4½ and 6 in., respectively, and at governed speed develops 43 hp., making a road speed of 16 m.p.h. The low gear reduction is 43.6:1.

The crankshaft of chrome nickel steel is carried on four main bearings, the front bearing and the center bearings being each 2½ in. long by 2 in. in diam., and the rear bearings 3½ in. long by 2 in. in diam. The standard wheelbase is 160 in., with 150 in. and 180 in. wheelbase optional. The standard wheelbase permits of a loading space back of the driver's seat of 139½ in. Special attention has been given the springs on this truck. They are the Tuthill semi-elliptic type, heat-treated and oil tempered both front and rear. The front springs are 51 in. long, 3 in. wide



Two-Ton Parker Chassis, Model F-20, With Giant Cord Pneumatics

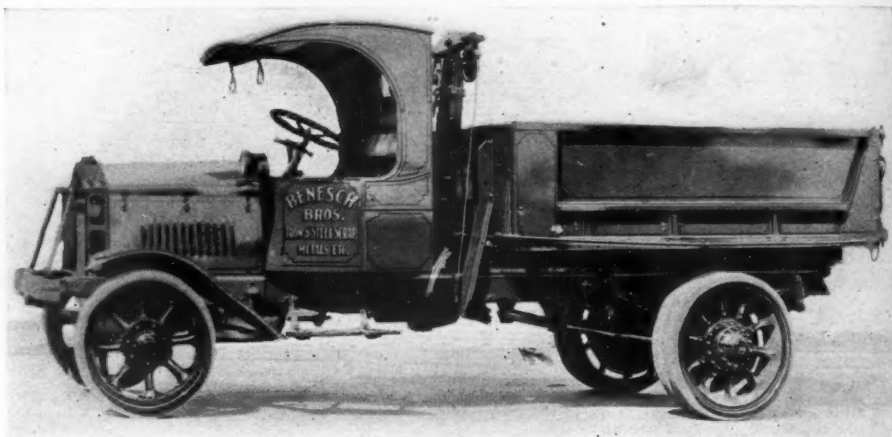
eliminated after an exhaustive study of their possibilities. It found that these sizes, with the possible exception of the 1½-ton model, covered only a very small portion of the versatile range of service required to satisfy the large number of truck users. On the other hand, it found during these eight years, that the 2-, 3½- and 5-ton sizes conformed more specifically to the demands and requirements of all truck users. Having arrived at this thoroughly considered decision, the Parker Motor Truck Co. has condensed its line and is now eliminating superfluous models and is concentrating exclusively on models of 2-, 3½- and 5-ton sizes.

There are a number of advantages to be gained by this standardization of models. Aside from satisfying the user, it enables the distributor to take care of the maximum volume of truck sales while carrying but three models on his sales floor and as many of the parts for all models are interchangeable, the distributor has a minimum parts investment with less space devoted to parts stock. The production of truck parts is also cheapened and production is facilitated by the elimination of different sizes of parts.

The company has ample facilities for equipping those of its models to be used in construction work with dump bodies and hoists.

The following is a resume of the units incorporated in the Parker line. Parker full-floating worm-gear rear axle of 3-piece electric cast steel construction and equipped with Timken taper roller bearings throughout. A Bosch high-tension magneto and Westinghouse two-unit starting and lighting system.

The power plant is a super-military type Wisconsin. Oil is pumped by a gear pump and is forced under 20 lb. pressure to the main bearings, connecting rod bearings and piston pin bearings. Latest type Monarch governor is used, bolted between carburetor and inlet manifold.



Five-Ton Parker Truck, Model M-9, Equipped With a Type B Cab and No. 441 Body

four-speed selective-type equipped for power-take-off and power-driven tire pump. Power is carried to the rear-axle through a tubular propeller shaft equipped with thermoid joints between the clutch and transmission and a Blood universal joint between the transmission and rear-axle. The steering gear is a Ross semi-irreversible worm and nut, fore and aft type mounted on the left side. Chassis points requiring lubrication are cared for by the Alemite system.

with 8 leaves, and the rear springs are 60 in. long, 3 in. wide with 16 leaves. The chassis frame is pressed alloy steel, channel section, 7 in. deep with 3 in. flange and of ¼ in. stock.

Steel wheels are standard equipment on this model and the tread is the standard 58 in. This standard tread is proving a big advantage on a truck of this size as it enables it to trail easily in the path made by preceding traffic. The list price is \$4400.

## Four Models in Aetna Line

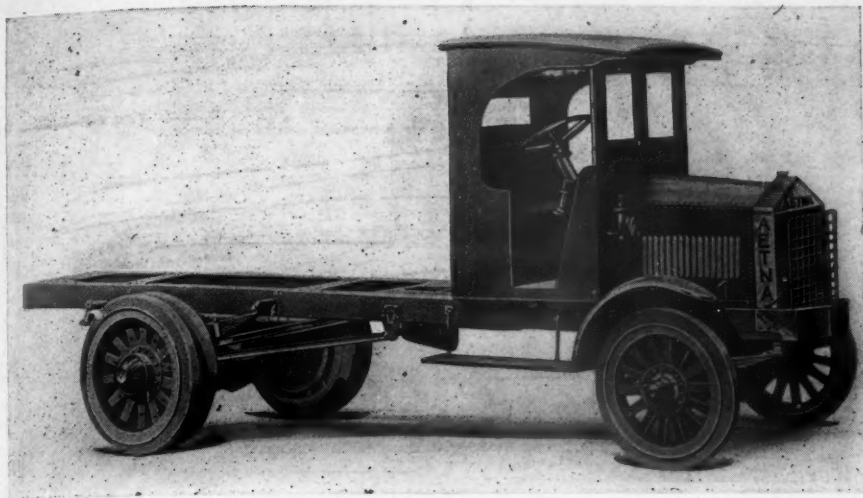
**T**HE Aetna Motors Corp., 617-21 W. 57th St., New York City, is offering to the trade a line of new trucks known as the Aetna. This line consists of four models having the following capacities: 1½ ton, 2½ ton, 3½ ton and 5½ ton.

The models are made up of standard parts, which are interchangeable on all

four models, a feature which entails a minimum parts equipment and requires less space to store, which would be necessary when handling an unstandardized line.

The following specifications apply to all Aetna models. Wisconsin engine, Borg & Beck dry-disk clutch, and four-speed Cotta transmission, mounted amid-





ships; Sheldon worm-drive rear axle, front axle and silicon-manganese steel spring; Zenith carburetor and Bosch magneto; hot rolled channel steel frame; Spicer universal joint; radius rods construction.

The standard equipment consists of cab, windshield, front bumper and radiator guard.

Side View of a New Aetna Model, One of a Line of Four, Manufactured by the Aetna Motors Corp., 617-21 West Fifty-Seventh Street, New York City. Assembled From Standard Parts.

## Diamond T Brings Out New Three and a Half Ton Job

**T**HE Diamond T Motor Car Co., Chicago, Ill., is offering a new clean-cut, flexible and sturdy  $3\frac{1}{2}$ -ton truck constructed according to the latest achievement of transportation engineering. The three principal characteristics incorporated in this new job, known as the Model "K", is expressed by the company in three words, economy, power and endurance.

The four-cylinder engine is cast in block, has a removable head which permits easy access and has a bore and stroke of  $4\frac{1}{2}$  and  $5\frac{1}{2}$  in., respectively. A special engine mounting is employed and it is suspended from the main frame at three points. This engine has an S. A. E. rating of 28.9 hp. and is said to be capable of developing a maximum of 45 hp. A speed of 12 m.p.h. results with a gear ratio of 10-1-3. The completeness of the water jacketing of the valves and cylinders is said to provide unusual cooling. The crankshaft is made of specially heat-treated chrome-nickel steel, drilled for forced lubrication of crankshaft bearing surfaces. This engine is equipped with a dependable, quick acting governor. Ignition is through a high tension Bosch magneto, Model CU-4, with impulse starter and spark advance. A vacuum feed system of carburetion, in which a Stromberg carburetor is used, which draws the fuel from a 20-gal. tank under the seat, is employed. A hot-air intake attachment for dash adjustment for starting is included in this system.

Cooling water is circulated by a centrifugal pump attached on the engine. This cooling system has a capacity of 8 gal. The outside case or shell of the fin and tube type radiator is built up of castings.

Power is transmitted from the engine through a multiple-disk, dry-plate clutch, to a selective type transmission, suspended amidships. This transmission provides four speeds forward and one reverse.

From the transmission the power is carried to a worm-gear-drive, full-floating type rear-axle, having a gear ratio of  $8\frac{3}{4}$  to 1. Although an optional gear ratio of 10-1-3 to 1, and 12 to 1 may be had Timken bearings are used throughout. Double universal joints are used between the transmission and rear-axle with slip joint to allow for spring action. Between the clutch and transmission universal joints on the flexible Thermoid-Hardy type are used, connected by heat-treated propeller shaft welded to the joints by a patented process. The rear propeller shaft, between transmission and rear axle is equipped with the standard all-metal Spicer universal joints. Hotchkiss type of drive is employed.

A worm and wheel type steering gear with adjustment for lost motion is used. It is a left-hand steer. The control levers for gear shift and emergency brake are in the center and hand spark and throttle controls are mounted on the steering column.

The frame, which is pressed channel section, 9 in., width of flange  $3\frac{3}{4}$  in. and thickness of stock  $\frac{1}{4}$  in., is carried on four semi-elliptic, chrome-vanadium steel springs. The front springs are 46 in.

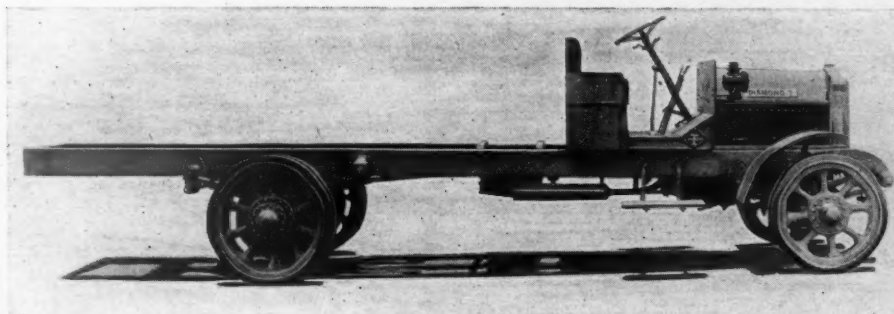
long, 3 in. wide and have 8 leaves, the rear springs are 56 in. long, 3 in. wide and have 14 leaves. All spring pins or bolts are of special steel, hardened.

Double internal expanding brakes on the rear wheels are used. The cast steel wheels are equipped with 36 x 5 singles, in the front, and 36 x 5 dual, solid tires in the rear. The wheelbase is 170 in. and 180 in., also 160 in. for dump body. The track, front,  $66\frac{1}{4}$  in. and rear,  $65\frac{1}{4}$  in.

The standard equipment consists of seat, extra heavy fenders, running board, governor, hubometer, oil side and tail lamps, lights, warning signal, complete set of tools and jack. Alemite high pressure lubricating system for chassis is used.

### Increased Production in June

About five thousand more passenger cars, and 400 more trucks, were built in Detroit and vicinity during June, than in May. Passenger car production was 161,261, and trucks 19,943. The increase is due largely to the Ford factory, June production being 72,931 passenger cars, and 10,931 trucks. The Dodge, Buick, and others, also showed increases.



The New Three and a Half Ton Diamond T Chassis is Replete With Special and Standard Units

## Vim Introduces New Models

A RECENT announcement made by the Vim Motor Truck Co., Phila., Pa., indicates that a number of changes have been made in the design of this company's well-known half-ton delivery job, which should be of interest to our readers. In the first place, Models 27-28-25 are superseded by Models 29-30-31. Models 29 and 30 are of half-ton capacity and are similar throughout, with the exception of the tire equipment. Model 29 is equipped with 31 x 4 in. pneumatics and Model 30 with 32 x 4½ in. pneumatics, all around.

In the new models a great deal of attention has been given to the displacement of the various engine parts, thereby giving more accessibility and reducing the time necessary in making repairs.

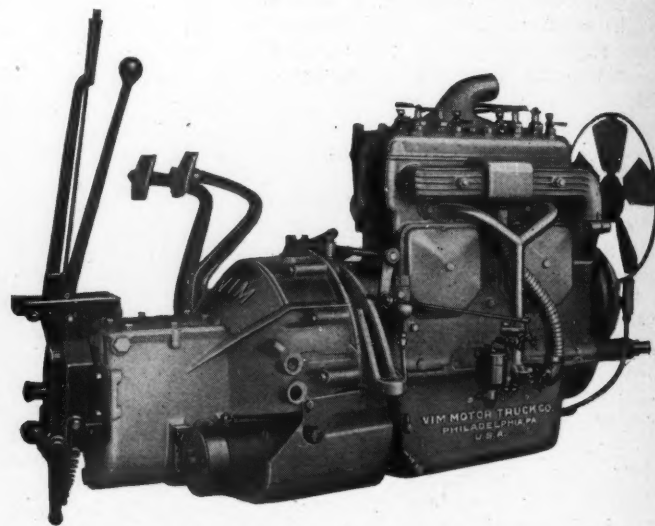
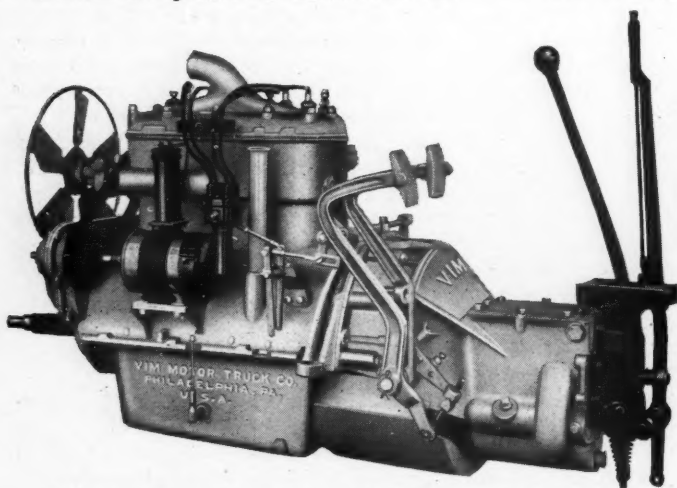
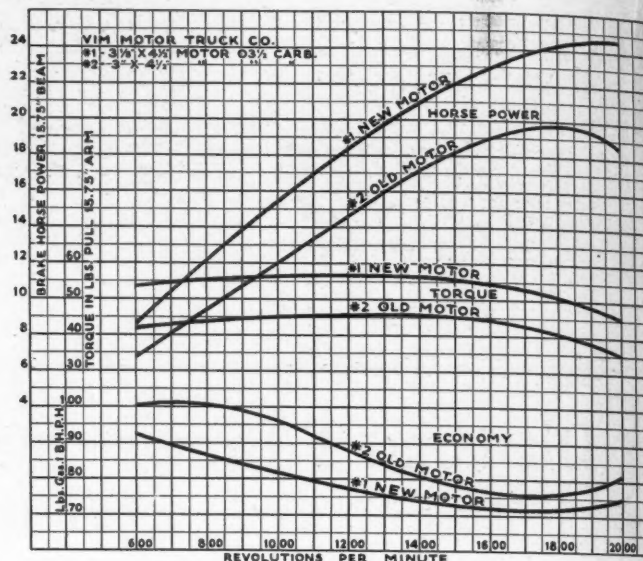
The new engine is more powerful than the one employed in the former model, the increase of power having been secured by increasing the bore by ⅛ in. so that the cylinders are now 3⅝ in. x 4½ in. instead of 3 x 4½ in. The compression has also been increased slightly, and other minor refinements have been made so that the horse power, torque and economy have been considerably increased, without affecting the feature of economical operation for which this model has always been noted.

Due to the persistent demand for an

electrical starter, the new model is fully equipped with the latest and most approved type of Westinghouse apparatus.

The location of these units is plainly seen in the accompanying illustrations. In these illustrations it will be noted that chains, sprockets, etc., formerly employed, have been eliminated and that the new engine equipped with electric starting and lighting devices presents an unusually clean appearance, and permits of ready accessibility for inspection and repair. The starting motor is so mounted that by loosening a few bolts the unit can be readily taken off the engine.

The accompanying diagrammatic illustrations show the result of dynamometer tests and give a good idea of the increase in power obtained as a result of the redesigning of this engine.



Left and Right Sides of the New Vim Engine, Which is More Powerful Than the One Formerly Employed, Showing the Accessibility Provided by the New Disposition of the Various Units

## Linn Geared-to-the-Ground Tractor

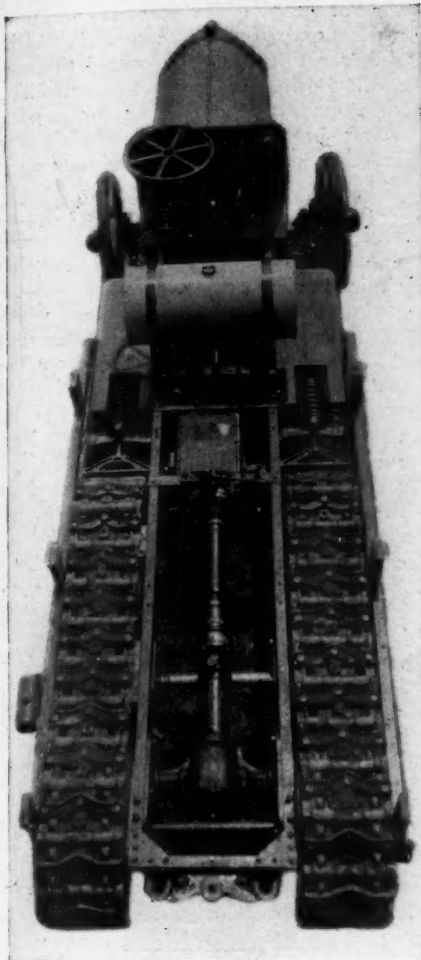
THE Linn tractor, manufactured by the Linn Manufacturing Corp., Morris, N. Y., is a self-laying track machine and is especially adapted to work on wood or lumber jobs, or heavy construction contracts, because it can do the work of ten teams, and it can travel over roadways in the woods and on soft ground where horses cannot go and draw a paying load. The tractor is claimed to be able to pull four times its own weight over ordinary roads, winter or summer. To perfect the traction power of a revolving track, a flexible traction member was invented, which will adjust

itself at all times to any unevenness in the road or field which it might encounter. This is an improvement over the rigid self-laying track as they often encounter spots or depressions and they have no traction at all. The construction of this track has been simplified, as not a bolt or nut is used in this traction member aside from the hangers which carry the axles. The sprockets and track-links are said to have an unusually long wearing surface. The track link joint has a 15-16-in. hardened pin, 13 in. long, that floats and has bearings its entire length. The anti-friction rolls are of ample size and strength and carry no weight on their axles.

The Linn tractor is made of such units as a Continental, Red Seal engine, Bosch magneto, Schebler carburetor, Brown-Lipe transmission and Brown-Lipe-Chapin differential, and Sheldon front-axle.

The four-cylinder, vertical, L head type, Continental engine, has a bore and stroke of 4½ x 5½ in., respectively. Engine speed is controlled by a Pierce governor. The crankshaft bearings measure 3¾ in. front, 3¾ in. middle, and 4 15-16 in. rear. Gasoline is fed by gravity from a fuel tank having a capacity of 30½ gal. through a Schebler 1¼-in. carburetor, which is equipped with a hotpot manifold. Ignition is





Bird's-Eye View, Showing the Transmission, Propeller Shaft and Rear Axle Assembly, and General Construction of the Track.

through a Bosch magneto. The splash and force feed system of lubrication includes a Continental, double-plunging oil pump and a Morris oil indicator on the dash.

Cooling water is circulated over the cylinder head and valve seats by a centrifugal pump. The radiator is honeycomb type and is a Mayo make. Cooling air is sent through the radiator by a large Oakes fan driven by a belt.

The sliding gear transmission system which provides four speeds forward and one reverse is the Brown-Lipe, four-speed, Model 60 transmission. This transmission provides the following speeds and normal pull in lb.: First or low, 1 mile, 12,000 lb.; second, 2 mile, 8000 lb.; third, 4 mile, 3500 lb., and fourth,  $5\frac{1}{2}$  mile, 2000 lb. Differential is a Brown-Lipe-Chapin and final drive is internal gear.

The front axle is a Sheldon, equipped with roller bearings and carrying two front wheels equipped with 36 x 5 rubber tires.

The length of a Linn tractor is 198 in., width 74 in., height 36 in., to the top of the cab, wheelbase 111 in., size of body, 9 ft. by 5 ft. 4 in., outside turning radius 17½ ft., weight packed for shipment 9000 lb.

The price is \$5000 f.o.b. Morris, N. Y. A front sled for winter use can be secured for \$50 additional.



Side View of the Linn Self-Laying Track, Geared-to-the-Ground Tractor  
This tractor is especially adapted on lumber and heavy construction contract jobs. Note the sled to the left of the tractor, this may be substituted for the front wheels for winter lumbering

## The Childs Triple Combination Fire Equipment, Mounted on a Reo

THE O. J. Childs Co., Utica, N. Y., has come forward with a triple combination hose, chemical and pump outfit mounted on a Reo chassis especially designed for small communities so that they can adequately protect themselves against fire. This complete fire department on four wheels is also particularly valuable to the community that is without high water pressure, as this apparatus will pump from any pond or creek.

The Childs Triple Combination truck may be had in many styles from a bare chassis with pump up to a body with chemical tank, ladder equipment, hose rack, etc., as desired. There is a wide range of designs for various makes of chassis, everyone of which is within reach of any small town or village. The following outfit is the Childs Triple Combination Chemical Engine, Hose Car and Pump equipment mounted on a Reo chassis:

**Hose Body:** Steel with ventilating slatted wood bottom. The floor is removable,

in two pieces. The standard body holds 1000 ft. of  $2\frac{1}{2}$  in. hose.

**Seat:** Upholstered and of ample size to comfortably seat two men.

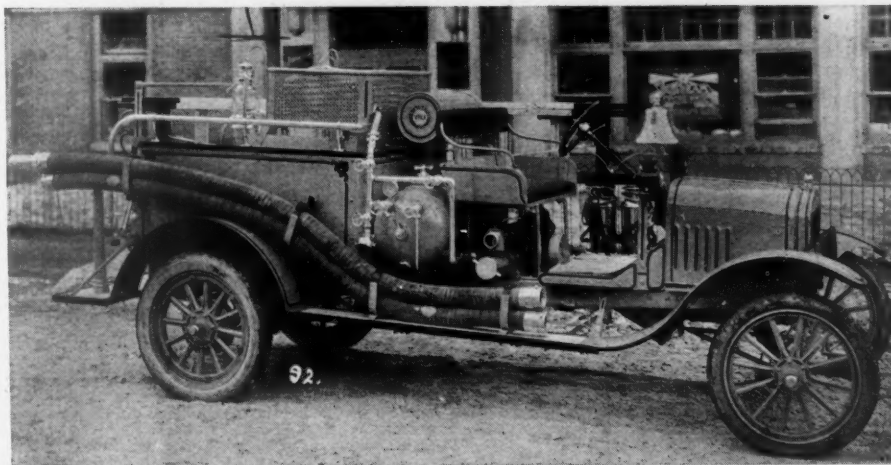
**Hand Rails:** One on each side of hose body, running along the top and down at rear. Polished brass,  $1\frac{1}{2}$  in.

**Rear Footboards:** Made of hardwood, edges ironed, covered with aluminum tread. Supported by heavy forged brackets.

**Side Running Boards:** Between front and rear fenders, on both sides of apparatus.

**Tool Box:** Made of hardwood, mounted beneath rear of hose body, between hose body and rear footboard. The door swings on spring hinges and opens downward. Box is of ample capacity for all tools.

**Ladders:** One twelve-foot ladder with patented folding hooks, and one twenty-four-foot rope-hoist extension ladder. They are mounted at side of body, in special holders, which prevent rattling.



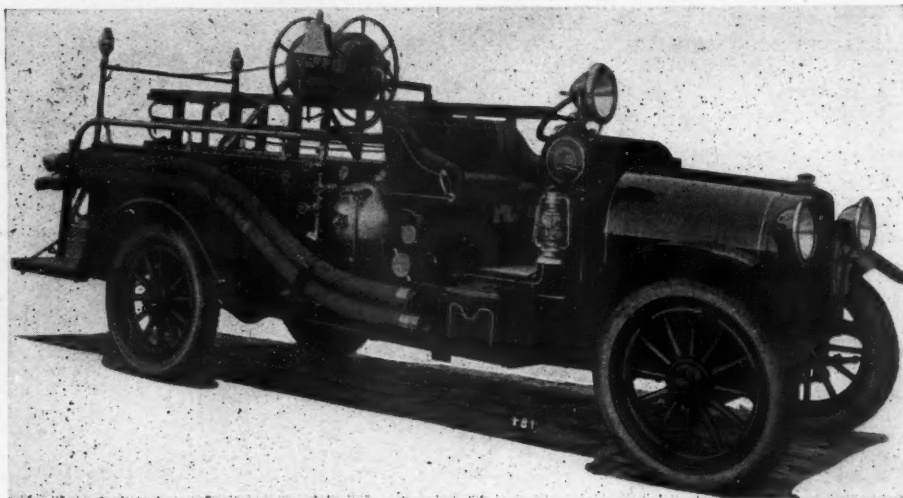
Childs Triple Combination Hose, Chemical and Pump Mounted on a Ford

**Rear Hand Hold:** Extends across back of body, at a height convenient for men riding on rear footboard.

**Torches:** Two, mounted at rear of body, at ends of hand hold. These torches burn lard oil and will not blow out, even in a strong wind.

**Lanterns:** Two Dietz fire department lanterns, mounted in special spring holders attached to sides of hose body.

**Bell:** Polished brass, locomotive type, 10 in., mounted in suitable bracket.



Childs Combination Fire-Fighting Apparatus Mounted on a Reo Chassis

**Extinguishers:** Two, polished copper, "Childs" No. 6, three-gallon size, equipped with carrying straps and shut-off nozzles. These extinguishers are provided with a special bottle-sealing device, which prevents slopping of chemicals and premature generation of gas on the way to a fire. They are secured by holders mounted on running boards.

**Equipment:** Other equipment consists of: One 6-lb. axe with pick-head. One set, polished brass axe holders with pick guard. One steel crowbar. One set, polished brass crowbar holders. Two play pipe holders, mounted on rear footboard. One pike pole with polished brass holders.

**Pump:** The "Childs" Rotary Fire Pump is not only adaptable to the intermittent application of power which is inherent in a gas engine, but also accommodates itself to the limited space available. The pump is equipped with two suction and two discharge hose connections, one on each side of the car. The discharge valves are of the quick opening, cam and floating, disk types. The suction connections are supplied with heavy brass caps.

A hand-operated, quick-opening brass churn or by-pass valve is provided between the discharge and the suction tubes of the pump. A lever is attached to the drive shaft of the car and engages the pump by throwing out the clutch and moving the lever forward.

**Suction Hose:** Two lengths of suction hose 10 ft. each, 3 in. internal diameter fitted with special heavy suction couplings.

**Strainer:** One special heavy brass "Childs" suction strainer.

**Chemical Tank:** "Childs" Type "E-1" 35-gal. polished copper tank, with hammered ends. Lined with lead alloy to prevent corrosion.

The tank is complete, with special acid-sealing valve and agitator.

Tank fits back of driver's seat and is mounted in saddles which attach to frame. Tank is operated by simply opening acid valve and turning agitator handle. When the tank is not in use, the agitator handle is held in place by

a special locking device. Overflow valve indicates proper filling level and acts as safety when removing cap. The tank, with piping attached is subjected to a hydraulic test of 350 lb. per sq. in. before leaving factory.

**Chemical Piping:** The tank is connected with the automatic reel or hose basket by means of a series of pipes and

valves. Piping includes all necessary valves and pressure gauge. A 2½ in. filling connection is provided threaded to fit 2½ in. hose, for convenient filling of the tank at a fire, or for running water through chemical hose while tank is being filled through large opening at top.

**Automatic Hose Reel or Basket:** Apparatus will be provided with either automatic reel or basket (customer's choice). The reel is connected to the piping through a stuffing box, which allows the chemical to be discharged while hose is being uncoiled from the reel. The basket is made of perforated steel.

**Extra Acid Receptacle:** One mounted on running board.

**Holder:** One, polished brass, mounted on running board.

**Soda Bag:** One, for extra soda charge, carried in holder on running board.

**Soda Canister:** One, polished brass, to carry soda bag, mounted on running board.

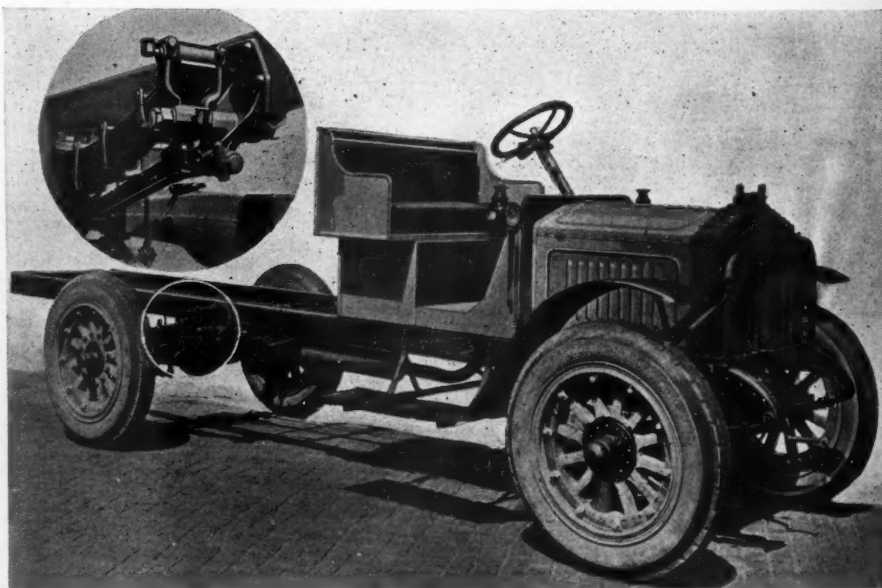
**Chemical Hose:** One hundred and fifty feet of best grade, four-ply, ¾ in. size, fire department standard, with polished brass coupling.

**Chemical Nozzle:** One, polished brass, shut-off type.

**Chemical Charges for 35-Gal. Tank:** Two, complete.

**Painting:** Entire apparatus finished in standard fire apparatus red, striped, and lettered in gold leaf to suit purchaser.

**Secretary-Manager Elber J. Shover**, of the Ohio Automotive Trade Assn., is busily engaged in organizing local associations throughout the state. Toledo and Bucyrus are among the new associations.



New Radius Rod Construction on Standard One-Ton Trucks Permits Ready Access for Quick Adjustment

The Standard Motor Truck Co., Detroit, Mich., constantly striving for the superlative, recently announced its latest improvement on its one-ton model. This truck is now being equipped with radius rods and will be known as Model IK. Service and facility for adjustment were the prime considerations in designing its new and distinctly standard radius rod. The wear on the working parts is compensated by simply tightening one bolt. Lubrication of the pins at the ends of the radius rods is provided by easily accessible oilers. The Model IK will have the Continental "N" motor; Brown-Lipe clutch and three-speed transmission; Timken semi-floating rear axle; Spicer universal joints; Eisemann magneto; Stromberg carburetor; Ross steering gear and Long radiator.



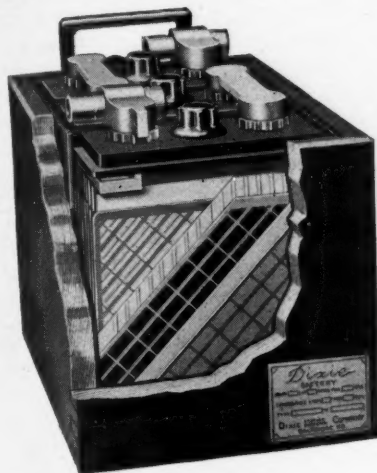
# TRUCK EQUIPMENT AND APPLIANCES



## Dixie Storage Battery

The important points of construction in the Dixie Storage Battery, emphasized by the maker, the Dixie Storage Battery Co., Baltimore, Md., are: the terminal posts, with metal part cast through a threaded hard rubber sleeve; the cover is laid on soft rubber gaskets, and held down with hard rubber lock nuts, which are screwed on the sleeves—integral parts of post. The result is a leakproof cover.

The separators, made of California cedar, are treated by a special process, to toughen and make them impervious to acid reaction. The heavy plates of a specially developed alloy give the battery



Dixie Storage Battery

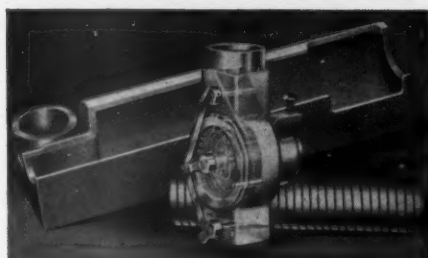
Cutaway view, showing reinforced grid, heavy jars and separators

longer life and greater capacity, and it is claimed that these heavy plates, in connection with special separators, practically do away with bucking tendencies. The analytical tests, through which all acids, rubber, metals and wood parts must pass before going into the Dixie battery, insure all materials being up to the necessary specifications.

## The B. K. F. Thermotrol

A device that controls the air, heat and gasoline accurately and at all times, is the new product of the B. K. F. Corp., 20 E. Jackson Blvd., Chicago.

This control is accomplished through the expansion and contraction of a thermostat, which controls the temperature at the gas-forming point, and from this point a true, dry gas passes into the cylinders, where every drop of it is exploded, extracting every ounce of power that is in the gasoline. No wet gasoline will work past the rings, carbon deposits are reduced to a minimum, and the engine will run more smoothly, and with more power and less vibration, represent some of the features claimed for this device. The



### B. K. F. Thermotrol

This device regulates the amount of hot and cold air that enters a carburetor. The valves, their levers and connecting links shown in phantom.

gas is automatically supplied to cylinders in volume proportionate to the speed.

This device is so designed that it will automatically maintain at a fixed temperature the air entering the carburetor by the use of this thermostat and valve arrangement, which is connected to the thermostat by means of dull crank levers and links. There are two valves, one in the hot-air inlet, which connects to the source of hot-air supply, and one that controls the amount of cold air, in case the air becomes too warm. When the engine is cold, the valves close off the cold air entirely and chokes the warm-air passage. This product has been worked out along scientific lines and is simply constructed.

## Expanding Rubber Stopper

Expanding rubber stoppers made of live rubber and brass and in eight sizes, so as to fit all radiators, is the product of the American Auto Radiator & Lamp Works, 85 Fayette St., Salem, Mass.

Brass is used in these stoppers to offset corrosion. The stopper goes right down in the hose connection, and does not extend in the way while work is being done on the radiator. Just a twist or two of the thumb nut gives a perfectly tight seal. It sells in eight sizes, from 3 to 11, and is priced from \$.40 to \$1.20, according to the size. The entire set sells at \$6. The Ford set, Nos. 8, 9, 10, sells at \$2.75.

## Gilmer Transmission Lining

Gilmer Ford transmission lining, manufactured by the L. H. Gilmer Co., Tacony, Philadelphia, Pa., is made with 46 picks to the inch. This construction gives rise to the following claims: exceptional body endurance to the lining, long wear, a sure grip and great strength to resist tearing from the rivets. It is also stated that by means of a special process it successfully resists oil, heat and moisture. It is packed in sales help cartons, containing 60 ft. rolls, with the necessary sets of rivets and in cartons holding 10 individual sets for Ford cars, each with rivets and lining complete.

## Lyons Storage Battery

Only the best of materials are used in the construction of the Lyons Storage Battery, manufactured by A. H. Lyons & Co., Stephen Girard Bldg., Philadelphia, Pa.

Each jar is individually sealed, which facilitates quick disassembly of the battery. Specially treated, porous-wood separators are used in conjunction with hardwood separators, making perfect insulation. The perforated, hard rubber separators hold the active material in place, thus preventing short circuits.

High grade oxide is used, which is securely held in place by reinforced triangle grids. Strong tee-type handles,



Three-Cell Lyons Battery

Cutaway of case, one jar and cover, exposing plates and separators secured by alloy strap to view

which set in flush with the outside of the case, and are smooth and rounded so as not to cut the hands, provide means of portability.

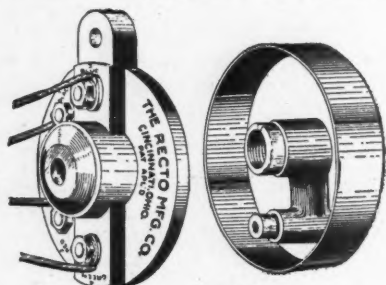
## Recto Timer

The Recto Mfg. Co., 23 West Third St., Cincinnati, Ohio, is offering to the trade a timer that is entirely made of insulating material. It is known as the Recto timer.

It is so constructed that the fan belt cannot interfere with the distributing wires. The terminals are arranged so that the distributing wires are more than 1/2 in. from each other, regardless of the position of the spark levers. The insulating material used in the shell, together with the position of the distributing wires and the Formica track which is not affected by oil or water, eliminate possibility of grounds and short circuits.

The brass contacts are knurled and pressed into the Formica track, then molded in bakelite under a 10-ton pressure and baked, making a solid firm contact, absolutely overcoming the possibility of a loose contact free from the effects of oil or water. The "corban"

metal brush is self-lubricating, reducing friction to a minimum, and is non-sparking, due to the great difference between its alloy and that of the brass contacts. The arm supporting the brush and carrying the current is made of brass. The spring behind the brush has a  $1\frac{1}{2}$  lb. pressure, and functions like a brush on a motor or generator. It pushes the



**Recto Timer**

Made entirely of insulating material. The brush is "Corban" metal brush, self-lubricating

grease and dirt before it, making a good, clean contact each time. This does not necessitate removing the distributing wires or disturbing any part of the timer. The brush can be changed quickly and easily by loosening the spring holding the timer head.

### Multiple Point Plug

The Multiple Point Spark Plug, manufactured by the Multiple Point Spark Plug Co., 8 Carroll St., Brooklyn, N. Y., embodies many new features in spark plug construction.

The feature of this plug is the wheel or fan, which revolves in the combustion chamber, caused by the suction of



**Multiple Point Spark Plug**

Note the revolving fan which prevents the accumulation of oil and carbon on the points and insulator.

the piston. The revolving of the wheel is said to prevent the soot or oil from settling on the sparking points, or insulator. This plug is made in two parts, shell and bushing. In case the insulator breaks it can be removed and replaced with a new one.

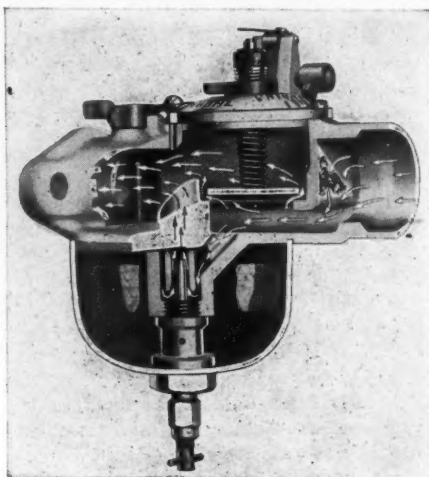
### Thermo Carburetor and Primer Combined

The combined Thermo carburetor and primer, manufactured by the Thermo Carburetor Co., 4313 N. Lincoln Ave., Chicago, incorporates many new principles in construction and operation.

In its construction there is a provision for automatically controlling the mixture, making it proportionate to the requirements of the engine, for the reason that the current of air in the upper part of the carburetor sets a corresponding velocity

in the diverted air passage, the Pitot tube. When the air valve is down at low throttle openings, most of the air is forced through the Pitot tube at high velocity, thus causing a rich mixture. As the throttle opening is increased, more air passes through the air valve, automatically making the mixture leaner without a change in the adjustment.

The Thermo has no choke; pulling the primer valve throws an additional spray of gasoline into the full air stream, where it is vaporized, and enters the cylinders as an explosive gas, facilitating starting. Fuel economy is made possible by the air valve dash control. This adjustment is made when the engine is hot, so that



**Cutaway View of the Thermo Carburetor**

a lean mixture is obtained when the engine is running normally. To provide the extra fuel required while the engine is warming up, it is only necessary to start with the primer and pull the dash lever control up to "rich". This holds down the air valve and forces air at high velocity down the Pitot tube, picking up a rich mixture of gasoline. As the engine warms up the dash control, lever is released and the valve is free to rise with the pressure of the air drawn through the intake, thus the normal adjustment is automatic. The fuel nozzle is of the atomizer type, around which a whirling suction of the air breaks the fuel twice, insuring perfect vaporization. There are no needle valves and no delicate adjusting devices to get out of order. It is made of a single aluminum casting, with brass fittings. It sells at \$12.

### Nu-Life Piston Ring Expanders

The Nu-Life piston ring expander can be used in connection with any make of piston ring. It is manufactured by the American Auto Products Co., 1319 L St., N. W., Washington, D. C. This device, which is made of light spring steel with resilient shoulders, pushes the piston rings outward in the right position, making perfect contact on the entire surface wall of the cylinder. It is claimed to save oil and gasoline by increasing compression, and that it gives more power

and ease of acceleration and reduces carbon deposits.

Nu-Life piston ring expanders are used on air-compressors, passenger cars, trucks, farm engines, gasoline engines, ice machines, marine engines, pumps, refrigerating machines, stationary motors, steam engines, turbines, etc.

When installing all carbon should be removed from the piston groove. The



**Nu-Life Piston Ring Expander**

piston ring expander is slipped into the groove, and the piston ring is then placed over the piston ring expander. To obtain best results a full set should be installed.

### The Sunbeam Tube Repair Kit

The Sunbeam Tube Repair Kit, put out by the Sunbeam Mfg. Co., 806 Grand Ave., Kansas City, Mo., contains a large piece of rubber and a large tube of cement, and a metal buffer. The extra-heavy rubber makes a strong and permanent patch on a tube, etc. The prepared surface is "tacky," and is protected by a covering of closely woven Holland cloth, that is claimed to be thoroughly airtight. This insures freshness of the rubber for a long period and protects it from changes in climate, thereby making it especially desirable for export purposes.

The Sunbeam Repair Kits Contain Patching Rubber, Cement and a Metal Buffer.



The special metal buffer used is claimed to be superior to any other. The cover on the kit is effectively printed in four colors, which, according to the manufacturer, proves a good sales feature, as it is, in effect, in keeping with the quality of its contents. This kit is made in three sizes: 60c, \$1, and \$1.75.

### The Mileometer Guide

The mileometer is an instrument that posts the driver, when traveling through unfamiliar countries, cities, towns and villages, indicating when and where to turn. It is manufactured by the National Mileometer Co., Ltd., 814 Marquette Bldg., Detroit, Mich.

Each route is logged in advance, at which time a master tape is made, with symbols indicating all turns, steam and electric railway crossings, curves, bridges, garages, hotel and points of interest.



From this master tape hundreds of duplicates are made. This tape moves across the face of the instrument in accordance with the movement of the car over the road. All tapes start and end at a service station, and are made up in units, or laps,



**Mileometer Road Guide**

of a good day's run between two principal points. These tapes are exchangeable free of charge at any of the hundreds of service stations located on these routes.

The mileometer is always in direct range with the eye, and is equipped with a pilot light which makes night traveling as safe as day. It is attached to the dash and connected to either front wheel. The mileometer is attached to the instrument board by use of a cast clamp bracket or wood screws.

### Stopshok Truck Wheel

The Stopshok Wheel Division of the Midwest Engine Co., Indianapolis, Ind., has introduced something new in the automotive industry in resilient wheel design. This new product is known as the Stopshok wheel and it is featured because of its resilient bearings, drive and brake.

By employing these wheels the weight of bodies and chassis can be materially lightened. These wheels are lubricated by dry flake graphite, one application of which will suffice for a 5000 mile run.

These wheels are said to entirely do away with the unsprung weight of the chassis, as the axle is full sprung relative to the wheel and tire, and the wheel

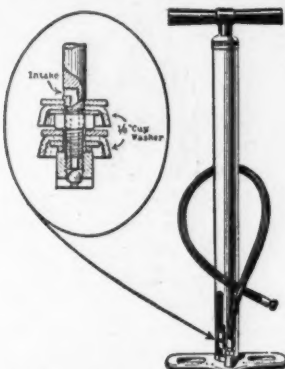
and tire are both sprung relative to the axle and ground. Three hundred and sixty degrees of  $\frac{1}{2}$ -in. resiliency is provided.

The automatic tension of these wheels adjusts the spring compression in accordance with load variations. The helical spring construction, which is the same type of spring used in freight car suspension, is the keystone or the seat of the resiliency of this wheel.

An easily accessible tension nut provides for any primary compression of helical spring necessary.

### Myers Auto Pump

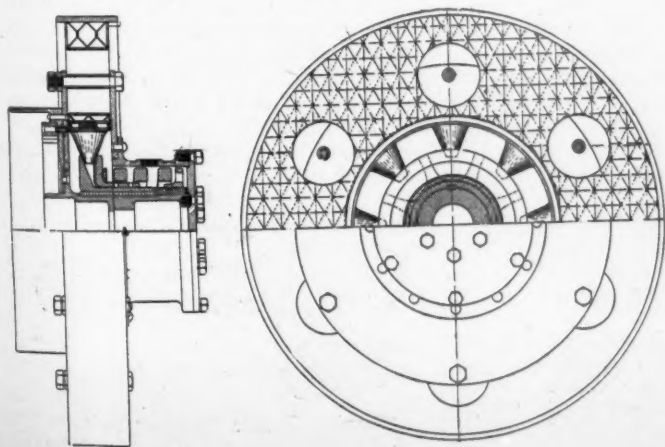
The Myers auto pump is designed with a wide pressed steel base, a  $1\frac{1}{2}$  x 20-in. single cylinder, a large malleable iron handle, a durable Schrader fastener, and finished with a dark green baked-on enamel. The plunger is fitted with two heavy cup leathers, which prevent the



**Myers Air Pump and an Enlarged View of the Valve Mechanism**

escape of air past the plunger on the down stroke, thus increasing the volumetric efficiency. The bronze ball valve is a positive check against back pressure from the tire. The vacuum release valve admits the air through the plunger instead of forcing it around the leathers, breaking the vacuum below and releasing the pressure above, thus allowing the plunger to withdraw without effort. The selling price is \$4. West of the Rockies, \$4.25. It is made by the Myers Auto Pump Co., Inc., of Paterson, N. J.

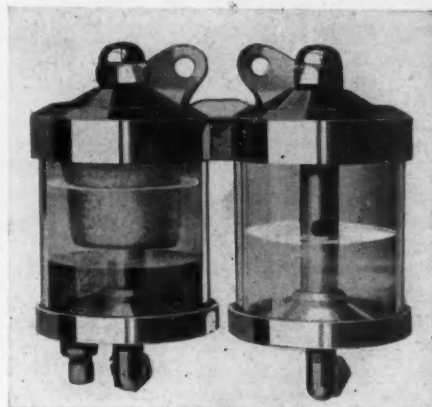
**Mechanical Views of the Stopshok Resilient Truck Wheel**



### Gascolator Filtering Device

The Gascolator, manufactured by the Visible Gasoline Filter Co., 1426 South Wabash Ave., Chicago, is a device for filtering gasoline.

It consists of two heavy steam gauge glass tubes held in a nicked frame. In the left jar there is built a chamois strainer. The instrument sits on the instrument board and taps the gas pipe just before it reaches the carburetor or vacuum tank. The gasoline runs into the left barrel of the gascolator, where it is strained through the two-way chamois



**Gascolator Filter**

Impure gasoline passes from the left jar, which contains a filtering chamois, into the right and thence to the engine, thoroughly purified.

filter, and the cleaned or filtered gas then passes through the right barrel to the engine.

The left barrel contains all the impurities, dirt, rust, water, etc. These impurities are drained off from time to time through a plug in the bottom. The right barrel contains the clean gas, providing a comparison between gasoline in a filtered and unfiltered condition.

### Simplicity Ambulance

The Simplicity ambulance, manufactured by the Interstate Mfg. Co., Milwaukee, Wis., is built in two models, namely A and B. The only difference in the construction of these models is the wheels, model A being equipped with 16 x 3-in. solid rubber tires, and model B with steel wheels.

This ambulance is equipped with a swiveled arm, provided with adjustable axle clamps, which fit any axle with or without truss rods. Provision is made for locking the turntable when used on

**Pneumatic-Equipped Model A Simplicity Ambulance**



rear axle. The axle is of the anti-friction type and of exceptionally sturdy construction.

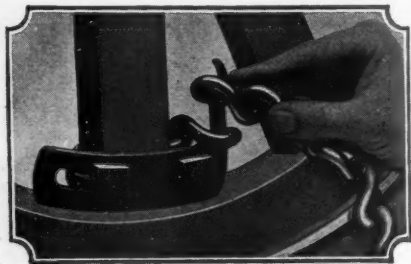
The following specifications apply to model A. The steel axle is  $1\frac{1}{2}$  in. diameter and 27 in. long. The swivel is cast steel. Arm, spring steel,  $1\frac{1}{2}$  in. square by  $27\frac{1}{2}$  in. long. Axle clamps, cast steel. Height 22 in., and weight 185 lb.

The foregoing specifications also apply to model B, differing only in the following points. The wheels are cast steel, 15 in. diam., and the ambulance is 20 in. high and weighs 160 lb.

### Parker Adjustable Anti-Skid Unit

The Parker adjustable anti-skid unit, manufactured by the Parker-Morse Co., Cincinnati, Ohio, are simple and practicable devices permanently bolted to the spokes of the rear wheels of motor trucks for the purpose of attaching non-skid chains quickly and conveniently when the occasion arises.

The practicability of these units was proven by a Government test recently conducted under the auspices of the Motor Transport Corps, with the result that

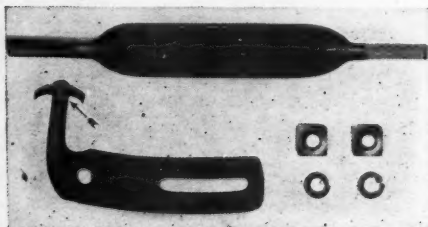


Attaching Chain Over Anchor

Parker anti-skid units were recommended for military service.

These units are made only in two sizes, but fit any shape of spoke, whether square, round or oval, of the wheels of any capacity truck perfectly and securely. Any ordinary chain fits these units and may be cut to desired length as needed. One feature of these units is the fact that the chains may be quickly and conveniently attached when the occasion arises without the use of jack or tools.

The complete Parker unit consists of a pliable metal clamp, which is drop forged, of special carbon steel, and which conforms to the size and shape of any spoke; a hook piece, which is also drop forged of heavy carbon steel, and two nuts and spring washers. On the end of the hook piece is a steel anchor over which the two ends of the chain are placed and then locked into position.



Parker Adjustable Anti-Skid Unit Disassembled

The following are meritorious features and facts put forth by the manufacturer. The strain on spoke and hook is practically eliminated as both ends of the chain attach to the same hook. The pull being exerted in opposite directions, equally distributes the strain. The chain cannot touch or mar the spoke. Slack permitting play is provided. Wear on the tires does not come in same place continually. The attachment of the chain is simple, easy and permanent, and the steel anchor makes it impossible for the chain to accidentally come off. The hook to which the chain is attached is placed conveniently on the outside of the spoke.

### Electric Disk Spark Plug

The Excelsior Leather Washer Mfg. Co., Rockford, Ill., announces a new spark plug, known as the Electric Disk Spark Plug. It is distributed by the Excelsior Auto Accessory Co., 200 Brown Bldg., Rockford, Illinois.



Excelsior Disk Spark Plug

This spark plug has a non-corrosive, high-resistance alloy disk at the base of the center stem, which is said to prevent the accumulation of carbon and oil in the base of the core, or at the spark gap. This disk serves further to hold back the pounding of compression against the insulator base, and it eliminates not only the tendency toward compression leakage, but also porcelain breakage due to high compression. The spark gaps are kept clean by the inrush of fresh gases on every impulse stroke of the piston. It further prevents the forcing of oil into the lower end of the plug about the base of the insulator. The heat accumulated to a certain extent in the electric disk assists in the vaporization of the gases in and about the base of the plug. Three electrodes give additional sparking surface. The magnetic effect of increased metal surfaces at the firing point aids greatly in the electrical efficiency of the plug, causing a lessened consumption of current with a more positive delivery of the spark.

### Liberty Foot Pump

The Liberty pump is a powerful single-cylinder pump constructed of good material and finished in black enamel. It is manufactured by the Apex Electric Mfg. Co., Chicago, Ill.

It has an extra-heavy seamless steel barrel, and is equipped with an improved handle. It contains a patented piston with special cupped leather treated under a private process. It is  $1\frac{1}{4}$  x 20 in. long. A leatherette cover is furnished with each pump as a protection from wear and tear in the tool box. It weighs 3 lb. and sells at \$3.

### Walker Porcelain Timer

The shell of the Walker porcelain timer for Fords, is made of a porcelain, that is not affected by oil, water, heat or cold, thereby removing any possibility of short circuiting. It is manufactured by the Walker Accessories, Inc., 1991 Broadway, New York City. The improved design of construction and the quality of the material employed are stated to enable it to function continuously and stand up indefinitely against the hand of time. The hardened steel contact points are embedded in a smooth porcelain race, which is part of the shell. As there is no fibre to wear, this construction overcomes soft and bumpy surfaces.



Walker Porcelain Timer

The contact points are embodied in the race of the porcelain shell

The rotate assembly is made of a high grade steel, and is of the brush or magnet type, being sufficiently strong to give long service. Contact is made by the hardened steel brush wiping contact points embedded in the porcelain race, and it produces a clean hot spark, which is claimed to give a quick start. It sells at \$1.75.

### Caster Trailing Spindle

The working principle of the Ford Mospico caster trailing spindle is the same as the casters of an office chair. It makes easy steering and enables one to drive through sand and mud with the same ease as on smooth roads. It permits the car to be turned in less than 4 ft. of space. It distributes the strain on the king bolt, reduces the wear on the front tires, prevents side thrust and skidding. Mospico spindles can be installed in less than forty-five minutes. Price, \$9.75. It is manufactured by the Motor Spindle Corp., Detroit, Mich.



Mospico Caster Trailing Spindle  
A new off-set front axle spindle for Fords





# SERVICE AND REPAIR DEPARTMENTS



Conducted by C. P. SHATTUCK

## Dealer Successfully Handles Truck Sales Through a Separate Organization

The Sales and Service Departments of the Truck Division of the Englander Motor Company,  
Although Closely Related as to Policy and Oneness, Are Entirely Separate



The Approach to the Sales Room, Showing a Neat and Attractive Sign Over the Entrance

IT is contended that the passenger car dealer is not successful in merchandising motor highway transportation. The term successful does not imply that he does not sell trucks, for he does. But sales do not always mean success. They do if considered from the financial point of view, but only for a limited period. Sooner or later the dealer realizes that service is paramount to sales; that unless he has an organization that renders service that satisfies, keeps the trucks on the road, he cannot meet the competition of truck dealers who do, and who are building for the future. And not until the passenger car dealer realizes that his success in the truck field depends upon a practical truck organization, based on sound policies, sales and service, and separates it from his passenger car departments, can he build a stable foundation upon which success is to follow.

A concrete example of the passenger car dealer who is achieving success in the motor truck field is the A. L. Englander Motor Co., Cleveland, O., distributor for Acme and Maccar trucks. Mr. Englander is one of those passenger car dealers who took on a line of trucks during the war when the truck industry was not so handicapped as was the passenger car. Unlike many dealers he did not consider the truck a vehicle to carry him until the passenger car factories

swung back into production. An intensive study of merchandising and servicing motor highway transportation convinced him that to sell trucks in volume, and keep them sold, required a truck organization entirely separate from passenger cars.

### Service and Sales Policies

Entire credit cannot be given Mr. Englander for the service and sales policies now in force. When O. L. Prior, the present manager of the truck division, was first approached by Mr. Englander, the former had to sell the head of the concern the plan that the manager of the truck division must be the manager and that the head of the service and parts departments should be high grade, experienced men. And if you should visit Cleveland, Mr. Dealer, take the Euclid Avenue car and stop at 71st Street and look over the show rooms, service departments, etc., of the Englander Co.

You will find Manager Prior will welcome you, and that L. E. Wideman, sales manager of the truck division, will be equally cordial. And after meeting these live wires shake hands with William M. Lynch, who is the service manager. If you can spare the time keep your eyes and ears open and watch Mr. Lynch meet the truck drivers and truck owners as they come in, and note how he handles

his corps of mechanics. Next call on H. A. Parker, manager of the purchase and parts department. All of these executives are pioneers in the automotive industry and hold diplomas from the school of experience.

For the benefit of those dealers who cannot avail themselves of the opportunity to visit Cleveland it is explained that the basic principle of the service policy is a guarantee of uninterrupted service. That is the slogan of the company. Instead of prating of the service to be rendered the prospect is shown the service bond and this guarantee is signed by the president of the company after the prospect affixes his signature to the sales contract. The bond or guarantee, copy of which is reproduced herewith, has several practical features. First, it insures the customer of the service of a truck whenever his car is at the service station longer than 24 hrs., and from any cause whatsoever. Second, this service endures for 18 mos. Third, the customer must have his general service work performed at the service station of the company.

### Advantages of Service to Sales Department

One of the advantages of the guarantee is that the idle time of the truck sold is reduced to a minimum of 24 hrs. Second, it impresses the prospect that in

THE A. L. ENGLANDER MOTOR CO.	
MEMORANDUM OF SALE	
Cleveland, O. 192__	
Enter make for Model _____ as per specifications below	
for which _____ agree to pay the sum of \$ _____ Herewith	
find deposit for \$ _____ the balance	
to be paid on the following terms: _____	
The above terms amount to \$ _____ each, and include interest and charges.	
Fire and Theft Insurance Premium \$ _____	Rate \$ _____ Amount of
Insurance \$ _____	Collision Insurance Premium \$ _____ Form _____
Payment of above deposit and balance, as per terms stated above, entitles _____ to the	
car scheduled for delivery by the factory to _____ on or about _____ 192__	
SPECIFICATIONS	
Chassis _____	
Col. _____	
Body _____	
Paint _____	
Tires—Front _____ Rear _____	
Excess _____	
Freight and War Tax _____	TOTAL _____
Accepted _____ Salesman to Manufacturer's Guarantee	
THE A. L. ENGLANDER MOTOR CO. _____ Purchaser	
Approved _____	Signature _____

NAME _____	
ADDRESS—Bus. _____	MARRIED _____
ADDRESS—Hm. _____	SINGLE _____
KIND OF BUSINESS _____	
NAME OF FORMER EMPLOYER _____	
ADDRESS _____	
I CARRY AN ACCOUNT WITH _____ BANK _____	
I OWN REAL ESTATE—IN WHOSE NAME IS TITLE _____	
DESCRIPTION LOCATION VALUE MORTGAGE HELD BY _____	
PERSONAL PROPERTY _____	
ANNUAL SALARY OR INCOME _____	
HAVE CONTRACT WITH _____	
NAME _____	REFERENCES _____
BUSINESS _____	ADDRESS _____
IF EVER BANKRUPT, DATE OF DISCHARGE _____	
EVER REFUSED CREDIT? _____	
The foregoing statement, both printed and written, has been carefully read by the	
undersigned, and is hereby certified to be true	
SIGNATURE _____	

### The Memorandum of Sale, Recording Details of Sale, Equipment, Etc.

This is made in triplicate, one copy going to office, another (yellow) to buyer, and third (red) to sales department. The back of form is filled out by prospect

order to give such a guarantee the company must be in a position to give service and desires to keep the trucks out of the service station. And the benefit to the sales force is not easily estimated. But the real punch to this service policy is the customer can lose but one day's use of the services of a truck.

Lest there be any misinterpretation of the policy it is explained that ordinarily a minimum and reasonable charge is made for the truck supplied. And there is another interesting policy and that is no charge is made for the truck supplied if the delay is the fault of the company. And there are numerous delays which can be laid to the average service station. If a customer's truck meets with a serious accident in which the driver is incapacitated, the service station will not

only supply a truck but a skilled driver to operate it. And several are steadily employed by the company. It may be contended that the salaries of these drivers increases the overhead. They do, but Mr. Prior states that the expense is more than equalled by the advantages to the sales department, and that the drivers are utilized to bring trucks from the factory to Cleveland. And when the chassis arrive they are tuned up and made ready for delivery, for the drivers are good mechanics and free from the faults of the average driveaway driver.

Although the service station does not operate at night, there is what is termed the night service station man. Customers are supplied with the private phone number of this night man, and in the event of trouble he can be called. Upon

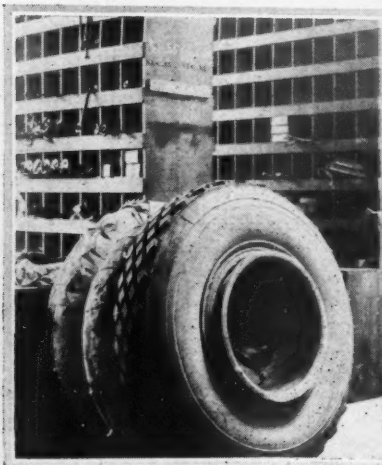
receiving a call for service, from an owner hauling cans of milk to the city in the small hours of the morning, for example, the service man is advised as to the location of the truck, type of truck and the trouble. A service truck is kept ready at the station and, assuming that the part broken on the farmer's truck can be replaced on the road in a reasonable length of time, the part is loaded into the service truck and a fast trip made to the disabled machine. If the trouble is serious, and a roadside repair is not practical, a truck is dispatched to carry the milk to its destination. The disabled machine is brought in to the service station and repaired for service the next morning, or another machine supplied the customer.

### Road Inspection a Feature

The service policy includes road inspection of the trucks. The inspector is supplied with a passenger car and picks up the trucks. While his work is conventional in many respects it differs from the average report form in that he makes a report on the load. The inspector also drives the truck, if necessary, and incorporates the driver's remarks as to power, speed, service, fuel and oil consumption, etc. The driver is asked to make a statement how often the oil is changed in the engine and lubricant in the transmission and rear axle. The kind of oil and grease used is also ascertained. If a shop inspection is necessary an appointment or time is set, and the form contains the information as to whether the truck was inspected on the road or in the shop.

These forms are made in triplicate. The original goes to the manager, another to the service manager, and the third is sent the owner. If the appointment is not kept or work recommended not ordered a letter is sent the owner. There are the usual follow-ups. No effort is made to cater to the driver other than assist him. If the inspector discovers a driver has tampered with the governor it is reseat-

A Corner of the Parts or Stock Room and Showing Some of the Big Pneumatics Stocked.



A Section of the Display Room and Showing a Truck Equipped With the Giant Pneumatics.

The office of manager and sales manager are at left, and doorway leads to salesman's department.



ed and a report sent the owner. Drivers do tamper with the governor, but time educates them to the fact that they will be caught and reported.

### Service That Satisfies

Inasmuch as to render service that satisfies, the service manager must have a corps of efficient mechanics as well as a part department that meets requirements, a few words as to the policies of Manager Lynch are appropriate. He has a hobby, if it can be called such, and that is courtesy. Now there are some service managers who practice courtesy only when in contact with the customers, and others who are courteous to their employees as well. Mr. Lynch belongs to the latter class. Years of experience in handling mechanics has taught him that the employee is as deserving of courteous treatment as is the employer.

If a mechanic makes a mistake in his work he is not called down, or "bawled out." His attention is called to the work,

but in such manner as to leave the impression that mistakes or carelessness are evidences of disloyalty to the organization. "The foreman or superintendent who cusses his men when they make mistakes is the type of man that is always changing mechanics and who experiences trouble in getting reliable, trustworthy men," said Mr. Lynch in discussing labor troubles. "My policy is to surround myself with loyal, efficient mechanics, and I have had the majority of my men with me for years and hope to retain them. I expect courtesy and loyalty from them and reciprocally try to be courteous and considerate in my relations with them. It pays."

### Mechanics Paid on Hour Basis

Work performed in the service station is on the hour basis plus parts and material. The mechanics are not trained for any particular operation such as bearing work, engine, transmission or rear axle, although some of them excel. The

Inv.					
Job					
Date					
Name					
DISTRIBUTION					
S. F. S.	Owner	Truck Firm	C. C. C.	State Agent	Club Leader

### The Envelope in Which All Forms of Service Department Are Filed After Work is Completed

mechanics are the all-around type and capable of doing any and all work, although certain men are called upon by Mr. Lynch to inspect or test certain units when in trouble. If it is ignition trouble there is a man who is quick at making a diagnosis of the trouble. And similarly there are others who can locate a carburetion, clutch, transmission or rear axle trouble.

Diagnosis of a trouble, however, is not limited to any one man. An example is the case of a truck that had been in

### Guarantee of Uninterrupted Service

Attached to and forming part of order given by \_\_\_\_\_ No. \_\_\_\_\_  
this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_ for the purchase of \_\_\_\_\_  
The A. L. Englander Motor Company hereby guarantees if the truck purchased under this agreement when disabled in the Service Station of The A. L. Englander Motor Company longer than 24 hours at any one time from any cause whatsoever that The A. L. Englander Motor Company will furnish another truck adequate to do the work of the truck purchased during such disability and within 24 hours from the time called upon to do so.  
This guarantee is made subject to the following conditions:  
First: It shall be binding upon The A. L. Englander Motor Company for 18 months from date of delivery of the truck but only as long as in the hands of the original purchaser.  
Second: Purchaser must have his general service work (as well as the particular work on the truck causing the disability) done by The A. L. Englander Motor Company at its Service Station in order to claim any rights under this guarantee. This contract shall not apply if the type of body of the truck is materially changed or altered.  
Third: In case of total wreck of this truck or loss by fire or theft, this guarantee will not be binding upon The A. L. Englander Motor Company longer than three weeks from date of accident or loss and at the expiration of said three weeks the entire liability under this contract shall terminate.  
Fourth: The truck so furnished by The A. L. Englander Motor Company will be driven by one of its agents or employees designated by it and the purchaser must pay for said truck at the usual rental rates in each when called upon by The A. L. Englander Motor Company to do so except when in the judgment of The A. L. Englander Motor Company's President or Manager such breakdown was not the fault of the owner or the driver of the truck.  
Witness our hand and seal at Cleveland, Ohio this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_  
THE A. L. ENGLANDER MOTOR COMPANY

Reduced Copy of  
the A. L. Englander Motor  
Company's Guar-  
antee.

### Purchaser's Exchange Car Statement

The A. L. Englander Motor Co.  
Cleveland, Ohio

Gentlemen:—

For the purpose of securing credit from you I hereby make the following representations and warranties regarding the car and its condition which I propose exchanging with you for a new one for the specified allowance against purchase price of said new car.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Make of Car \_\_\_\_\_ Motor No. \_\_\_\_\_ Chassis No. \_\_\_\_\_  
Type or Size of Car \_\_\_\_\_ Style of Body \_\_\_\_\_  
Condition of Axle \_\_\_\_\_ Condition of Transmission \_\_\_\_\_  
Rear Motor Bearings Loose? \_\_\_\_\_  
Is there Lost Compression on any Cylinder? \_\_\_\_\_  
Condition of Battery \_\_\_\_\_ Condition of Body \_\_\_\_\_ Paint \_\_\_\_\_  
R. F. Tire \_\_\_\_\_ R. R. Tire \_\_\_\_\_  
L. F. Tire \_\_\_\_\_ L. R. Tire \_\_\_\_\_  
Clutch \_\_\_\_\_ Tools \_\_\_\_\_  
Extra Equipment \_\_\_\_\_  
Repairs Needed \_\_\_\_\_

I hereby use the words "motor sound" to guarantee that the motor block of this car is not scored or cracked and that the crankshaft has not been sprung or injured.

I hereby use the words "frame sound" to guarantee that this frame is not cracked.

I guarantee and represent to you that this car is my property, is fully paid for and there is no mortgage or lien against said car and that I will warrant and defend the title of said car at any time.

Proposed credit to be allowed me for this car.

Salesman \_\_\_\_\_  
(Signed) \_\_\_\_\_

The Purchaser's Exchange Truck Statement Used to Place Trade-in Prospect on Record as to Condition, Etc.

The truck is passed on by the sales and service department after form is filled out by the prospect

### THE A. L. ENGLANDER MOTOR COMPANY

### TRUCK INSPECTION REPORT

Address \_\_\_\_\_ Cleveland, Ohio \_\_\_\_\_ 19\_\_\_\_  
Phone No. \_\_\_\_\_  
Nature of Work \_\_\_\_\_  
Make and Chassis No. \_\_\_\_\_ Style of Body \_\_\_\_\_  
Condition of Tires \_\_\_\_\_  
" Springs \_\_\_\_\_  
" Clutch \_\_\_\_\_  
" Transmission \_\_\_\_\_  
" Axle \_\_\_\_\_  
" Motor \_\_\_\_\_  
" Universal Joint \_\_\_\_\_  
" Wheels \_\_\_\_\_  
" Steering Gear \_\_\_\_\_  
" Governor \_\_\_\_\_  
" Carburetor \_\_\_\_\_  
" Magneto \_\_\_\_\_  
" Radiator \_\_\_\_\_  
" Brakes \_\_\_\_\_  
Inspector's report on load \_\_\_\_\_  
Inspector's report on remarks of driver as to power, speed, service and gas or oil consumption \_\_\_\_\_  
Inspector's report as to any special recommendation, particularly as to whether truck is being kept well lubricated and tightened \_\_\_\_\_  
Driver's statement as to how often oil has been changed in the motor and grease in the axle and transmission \_\_\_\_\_  
Kind of oil and grease used \_\_\_\_\_  
Date for shop inspection \_\_\_\_\_  
Was truck inspected on the road or in the shop \_\_\_\_\_  
By whom \_\_\_\_\_ Date \_\_\_\_\_  
Noted \_\_\_\_\_  
Noted \_\_\_\_\_  
Supt. Truck Service \_\_\_\_\_  
General Truck \_\_\_\_\_

Road Inspector's Report, Which Differs From Conventional, in That Driver Supplies Information as to Oil, Etc.





of standard material he was able to supply them because of his policy of anticipating the future. Equipment for trucks is purchased direct from the manufacturer when possible. Local jobbers supply much of the standard material.

One of the rules of the service, and sales departments for that matter, is that verbal orders are not recognized. The system begins with the sale of the truck, and the sale form which is reproduced is made in triplicate. One copy, yellow, is given to the buyer, and the third, red, goes to the sales department. A form, in triplicate and in colors, termed the truck assignment, is made out. It gives complete details as to the body, tires, equipment, etc. The original goes to the cashier, a copy to sales department, and the third to Mr. Lynch, service department. A requisition is then issued by the clerk of the service department and the supply or purchase of the equipment is up to Mr. Parker. The requisitions are made in duplicate, Mr. Parker retaining a copy. Nothing leaves the parts department without a requisition being left to account for the article. If a mechanic breaks a bolt and needs a new one, he must obtain an order for a duplicate.

#### The Repair Shop System

Routing the work through the repair shop is simplified by the use of a serially numbered repair card comprising a white sheet attached to a card. A carbon is employed to transfer the orders to the card, and the driver or some responsible party must sign the order. If work is to be done not entered on the sheet the owner is telephoned or communicated with. When he is telephoned he is asked to give the number of his purchase order for entry on the sheet until the order arrives. The card then goes to the foreman and when the job is assigned the card is placed in a leather envelope and attached to the truck. The parts, material, etc., are entered on back of card. Time cards are conventional.

One of the cast iron rules of the company is that no driver, owner, or anyone else for that matter, can obtain a truck, new or old, unless he has a release order. This is a small slip that is issued from the cashier's office for the owners and drivers. One cannot even secure a truck he has paid for without one of these release orders, for Mr. Lynch would not honor Mr. Prior with a truck or for work done without a release. Gasoline or oil, or work to be done for the salesmen cannot be secured without a requisition.

It is the policy of the sales department not to accept used trucks as part payment for new except the Acme and Maccar and three well known makes which are represented in Cleveland. Whenever a prospect desires to trade in a truck he is given the form shown herewith to fill out. As is obvious from the data the prospect is asked to supply he is placed on record and, should conditions arise, such as misrepresentation by the prospect, the sales department is supplied with some practical evidence.

Inspection of the trade-in is made by Mr. Prior and Mr. Wideman, after which

the truck is sent to the service station for an inspection by the experts. A price is then determined and it is final for the salesman. Trucks taken in are rebuilt, new tires put on, and the job repainted. It may be stated that the allowance plus the rebuild is made on such a basis that a profit is secured. Overhead, advertising and sales are included.

#### Adopting Salary Salesman Plan

Although the older salesmen receive commissions the company has adopted the salary plan with the newer men and those to be engaged in the future. One of the advantages of the plan is that it makes possible the use of two or more salesmen with a prospect without involving any argument as to the commission. There is another advantage in that a salesman may not have the proper temperament to approach a certain prospect, and consequently make an unfavorable personal impression. With the salary plan, use can be made of another salesman or a third if necessary. And there is more reason to believe that the salesman who cannot sell the prospect will be more willing to turn over his data to his successor than would the commission salesman. The plan is to be given a thorough trial. Salesmen are supplied with cars and allowed a certain sum weekly for operation and maintenance.

#### Salesmen Sell Equipment

It is the policy of the sales and maintenance departments to advise and educate the customer as to the best oil and lubricants to employ. No attempt is made to sell, however. But when it comes to the selection of the body for the chassis, cabs, windshields, headlights, lighting systems, gas and electric, tires, power pumps, trailers, etc., a sale is not considered satisfactory unless the prospect is sold the necessary equipment. And all equipment is sold at list price despite the fact that some dealers maintain it can't be done. And there is profit in it. Sales Manager Wideman showed the

writer the records of equipment sales on the orders or contracts and with the prices carried out. And they were the list or retail prices. This policy of selling the truck equipped for the work it is designed to fulfill duplicates the policy of merchandising trucks. Salesmen are trained to sell the work that the truck does, not trucks, and to see that the right kind of equipment goes on the chassis. And further, it is the policy of the company to see that the truck remains sold, by seeing that the customer obtains the results for which the truck was sold for. This involves keeping a personal contact with the customer, of aiding him plan his routing, unloading and loading methods, reducing idle time, etc. And the policy is a sound one, for satisfied customers are the best salesmen for the company, and they do not draw commissions.

#### Why Service Station Pays

Primarily this article was intended to deal only with the service policies of the A. L. Englander Company, but in analyzing the methods it was found that sales and service were so closely interwoven that both had to be considered. Anticipating the question, does the service station operate at a profit, it can be said that it does. Probably the balance on the right side of the ledger would not be as large were such costs as those involved in unloading chasses from the freight cars, washing, greasing, tuning up, minor adjustments, etc., not credited to the service department. Those dealers who do not credit the service department, but never fail to charge it the usual overhead, etc., argue that the results in dollars and cents are the same, so why credit? There is a psychological reason and that is, the heads of the service department, and the employees as well, are encouraged to greater efforts. For is it not true that we all hate to be tied to a losing proposition? And how can a service department be expected to pay if it is not credited with its production?

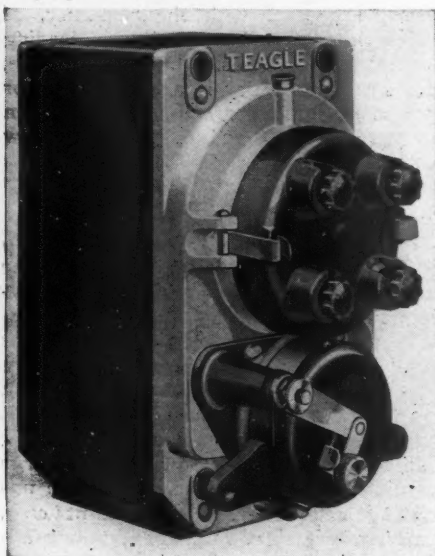


Giant Pneumatics Are Displayed in the Show Room as Well as Sewell and Jaxon Wheels

The photograph shows a 44 x 10 alongside a 35 x 5 pneumatic, and a copy of the Commercial Car Journal to indicate the dimensions of the larger tire. The book is 11 1/4 in. high

# Repairing, Cleaning and Adjusting the Teagle Magneto and Impulse Starter

**T**HE following methods are those employed at the factory of the Teagle Company, Cleveland, Ohio, for disassembling, cleaning and adjusting the Teagle magnetos but the directions do not include all work done at the factory or the factory appointed service stations. The instructions given herein and illustrated are those that may be



The Teagle Variable Spark Type of Magneto, a Direct, High-Tension Magneto of the Inductor Type

carried out by the repairman or service station mechanic, and no other work should be attempted.

The Teagle magnetos, which are produced with the variable and fixed spark, and with provision made for the use of a battery, are direct, high-tension instruments of the inductor type. Impulse starters can be attached and are supplied by the company. All types of Teagle magnetos are designed to operate in one direction only, clockwise. Straight bar magnets are employed instead of conventional horseshoe type.

## How to Locate Troubles

Failure to obtain a spark at the plugs should not be ascribed to the magneto until it has been determined that the plugs, cables, connections and switch are not at fault. If the engine fails to function after removing the wire from the grounding terminal on the magneto proceed as follows: Remove magneto from engine and clean exterior with a cloth moistened with gasoline. Wipe dry and place on a clean piece of paper on the bench. **NEVER FLOOD MAGNETO OR ANY OF ITS PARTS SUCH AS BREAKER MECHANISM OR DISTRIBUTOR WITH ANY CLEANSING FLUID.**

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## Cleaning Circuit Breaker

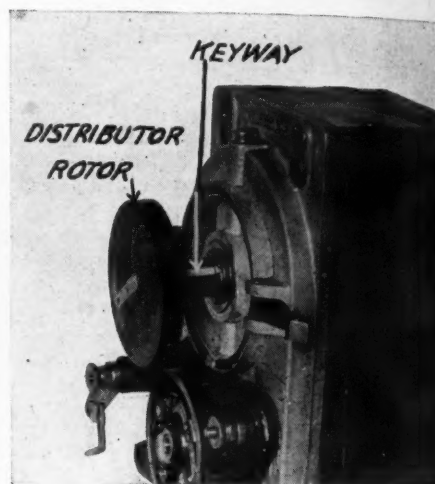
The directions dealing with models 77 and 77B will apply in general to all of the other models including 50, 60 and 77V. After cleaning exterior loosen breaker cover terminal screw and slip terminal arm to one side. Remove breaker cover: The terminal screw is mounted in this cover. The best way to clean breaker assembly is to remove the breaker house which carries the breaker assembly. Clean breaker cam and breaker assembly with cloth moistened with gasoline or if compressed air is available the dust and other foreign elements can be blown out easily. Inspect the contact points and if burned or pitted, which condition is due to the presence of oil, clean and true the points.

## Cleaning Contact Points

If the points are in good condition, meet squarely, but require cleaning only, proceed as follows: Turn rotor shaft into points contact. Separate points and in-

sert a strip of clean paper. With points gripping the paper pull it out. Repeat operation using clean paper until points are clean.

If points are burned or pitted proceed as with cleaning but use a fine jeweler's file instead of the paper. Move the file back and forth slowly and at right angles to the points. A few strokes should re-



The Distributor Rotor Has Broached Keyway and Can Only be Replaced Correctly

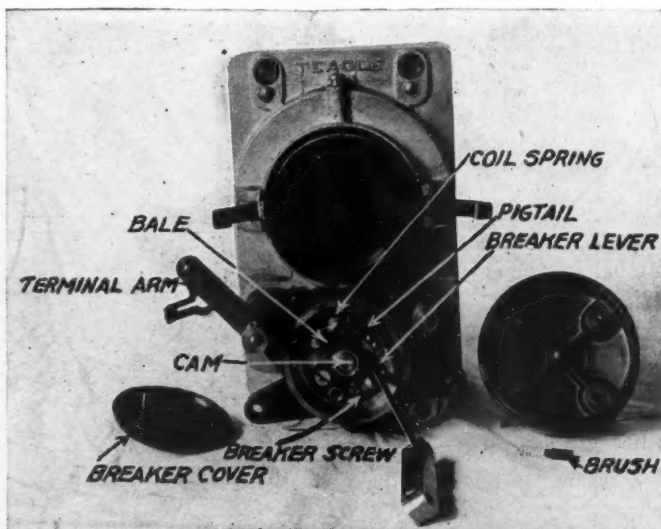
The rotor is shown pulled part way out to indicate keyway and the tongue registering with keyway

move any high spots. Care must be taken not to remove too much of the metal and that the points touch or contact squarely. Remove all traces of the filings and if necessary remove the breaker housing. Cleaning or truing the points should be done previous to the cleaning of the breaker assembly.

If too much metal has been removed in an attempt of the driver or the owner to true the points, new points will have to be used. The breaker screw can be removed by loosening a lock nut and backing out the screw. The other point is carried on the breaker lever, which must be removed and replaced with a new lever assembly if the point is worn badly. To remove lever assembly push the bale to one side. Attached to the lever assembly is a pigtail, a thin strip of metal, and the other end of this pigtail is anchored to breaker housing by a small screw. Remove pigtail screw and pull out lever assembly.

## How to Install New Lever Assembly

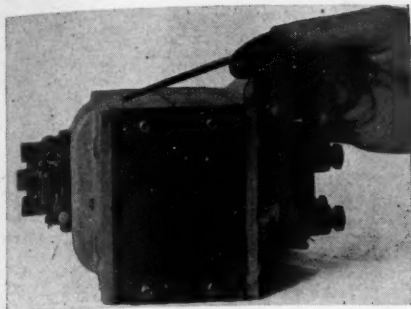
To install a new lever assembly lay the magneto flat on the bench with breaker side upward. The points are made to contact by the tension of a coil spring, the breaker lever spring. The points are separated by the



Illustrating How to Use Feeler Gauge in Determining Gap or Break of Contact Points

Cam is shown contacting with fibre on breaker lever when points should be fully separated. The breaker lever assembly can be removed with breaker house, being attached to it





Showing How to Use a Scribe When Displacing Filler Used to Seal Magnets in Frame, Etc.

cam contacting with the lever moving lever away from the fixed contact, and contact of the points is re-established by spring tension when the cam is in a vertical position.

Catch the long end of the coil spring on its post or stud and slip hooked end over breaker lever. Swing lever to the right, clearing the fixed contact, the replace lever on its stud and push lever and spring in place. Test action of lever and see that points contact squarely and that they separate when cam contacts with lever. It is also important that there are no high spots. Replace pigtail and its screw. Slip bale in place. The pigtail should be clean. There is no pigtail on the fixed spark magnetos, models 50 and 60.

#### Adjusting the Contacts

Next adjust the contact points. This may be done by one of two ways. Turn rotor shaft until points fully separate. An accompanying illustration shows the proper location of cam and the use of a feeler gauge for determining the correct gap. Use a gauge of .015-in. If gap is too large or small, loosen lock nut of fixed contact screw and with small screw screw in or out the contact screw. Use gauge and tighten lock nut. Try gauge a second time after locking nut as adjustment may be altered in setting up the nut. Another way to adjust points is bring the points together with cam on fibre shoe of lever. Back off breaker screw one-half turn. This will give an opening of exactly .015-in.

#### Cleaning Distributor

To remove the distributor block or cover slip the clamps or springs to one side. Clean interior of block with cloth moistened with gasoline or use compressed air. Inspect and test action of the carbon brushes and springs (4). In replacing a damaged brush with a new one the old spring can be used. Slip it over the small end of brush, insert spring in block or cover and push home. See that the brushes move freely and that the steel or brush in center of cover also moves easily.

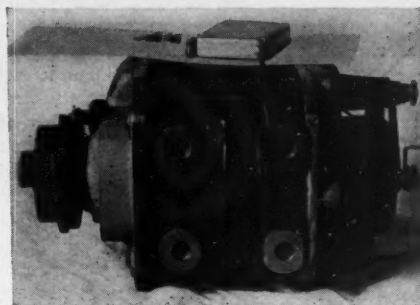
#### Resurfacing Motor Assembly

Examine the face of the distributor rotor (it has a brass insert and distributes the high-tension current to the brushes) and if face is burned or rough it should be smoothed. The distributor rotor is removed by pulling straight out. If it sticks place the tip of a screw driver blade on each side and pry out gently. Do not attempt to remove with one screw driver as the leverage will crack the rotor member.

Place a sheet of 00 sandpaper, abrasive side up, on a surface plate. Lay rotor with brass insert side on paper and, exerting an even and light pressure on rotor, move it back and forth a few times. Continue operation until surface is smooth. Clean rotor with cloth moistened with gasoline and replace. To replace rotor assembly see that the groove or keyway in its hub or shaft aligns with key or tongue in the rotor carrier. Rotor can only be replaced correctly. An accompanying illustration shows keyway and key aligned and rotor ready to be pushed in position.

#### Removing the Magnets

If, after complying with these instructions, the magneto fails to deliver a spark it should be sent to the factory or the nearest factory appointed service station. In the event condenser trouble be suspected and a test is to be made of the condenser, the magnets will have to be removed. But the magnets should not be displaced unless one be equipped with the special remagnetizing equipment made by the Teagle Company. This outfit can be purchased direct from the company. It



To Test Condenser Insulate It as Shown and Use 110-Volt Lighting Circuit

is explained that with the straight bar magnets a keeper cannot be used so the magnets must be remagnetized after removal from an instrument.

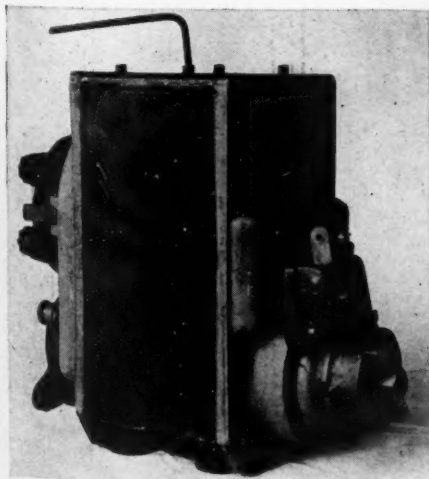
The displacing of the magnets is not difficult. The first step is to remove the iron filler between the magnets, the top casting, etc. This filler is employed to seal the opening, to prevent entrance of foreign elements. The filler is used on the sides of the magnets as well. To displace filler use a sharp pointed tool, such as a scribe as shown in an accompanying illustration.

#### Unlocking the Magnets

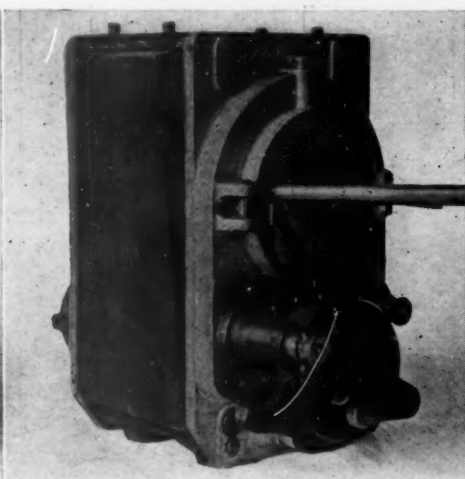
The magnets are retained in place by headless set screws extending through the top casting. There are four of these screws, two on either side, or one to each magnet. Loosen magnet set screws on left-hand side when facing distributor as only two magnets are to be removed. The magnets should come outward as their ends are beveled to a five- and fifteen-degree angle. If they stick insert a screw driver between distributor rotor carrier and housing and push outward on magnet as shown in an accompanying illustration. The distributor rotor must be removed to do this.

#### Testing the Condenser

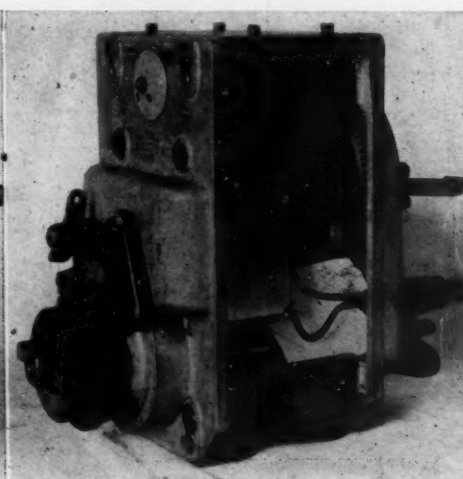
The condenser is secured in place by two screws, and there are two leads or wires connecting it to a terminal. It is not necessary to disconnect other than the two screws of the condenser to remove



The Magnets Are Retained in End Plates by Headless Set Screws



If Magnets Stick Insert Screw Driver Between Distributor Rotor Carrier and Housing and Push Outward on Magnets



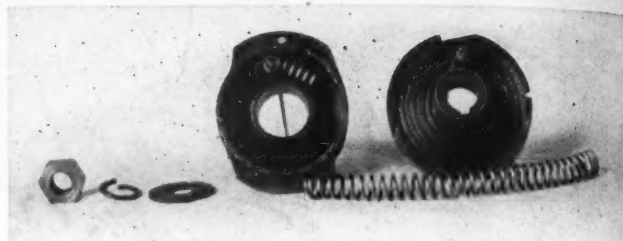
Showing Magnets Removed to Afford Access to Condenser

it sufficiently far enough to test the condenser. Place a strip of non-conducting material on the side of the magneto, and place the condenser on top of the material or as shown in an accompanying illustration. Connect an incandescent lamp in series with a 110-volt lighting circuit, and touch one lead to the condenser and the other to the ground terminal. If the lamp does not light it indicates the condenser is not at fault. If condenser is punctured replace with a new one. This will necessitate the removal of the two condenser leads at the ground terminal.

**Replace magnets (2).** The correct replacement is easily determined by having the five-degree bevel at the top. Refill all cracks at the top and sides with a good dependable filler and allow same to dry before removing the surplus material. A coarse grade of emery cloth will remove the surplus filler after which the magnets should be painted with a black paint.

### Impulse Starter Units

Showing ratchet and case, rotor shaft nut, lock washer, flat washer, bumper spring, long spring and ratchet.



twice a season in the oil ducts located at either end of the magnetos. No other parts require lubrication. It is also suggested that the circuit breaker and distributor be cleaned occasionally and the points inspected and the gap gauged.

The dealer not conveniently located to a service station or the factory is warranted in stocking the following list of spare parts which list is not expensive. Substitute parts should be avoided.

Number	Catalogue Number	Name	Models Used
1	282	Breaker Screw Wrench	All
1	601	Breaker Lever and Point Assembly	77 77B
1	837	Breaker Screw	All
1	838	Breaker Lever and Point Assembly	66 60
1	851	Breaker Contact Screw	77 77B
4	530	Distributor Carbon Brush	All
4	531	" " Spring	All
1	764	Distributor Rotor	All*
1	771	" Cover	All
1	451	Breaker Cover	50 60 66

\*The distributor rotor for model 77V differs from others in that the brass insert is longer. That part contacting with brushes is 1 3/4 in. long while on other models it is 1 1/16-in. The model 77V is used with an auxiliary battery vibrator for starting and, therefore, requires a longer surface contact of the brass insert with the brushes. The cam is also slightly different.

### End Plates Are Doweled

The high-tension coil cannot be removed by other than the factory or a factory-trained man, for to remove the winding it will be necessary to entirely disassemble the frame construction. The end plates are die cast, and are secured in place by dowel pins and screws. **THE REPAIRMAN SHOULD NOT ATTEMPT TO REMOVE THE COIL.** Special tools are required for the work.

### Lubrication of Teagle Magnetos

As more trouble is developed through over lubrication than not enough the Teagle Company recommends the use of from 10 to 15 drops of light machine oil

### Battery Types

With those types designed to use a battery for aiding in starting care must be taken to properly conduct the leads from the battery. The model 77B is the same as the model 77, except that one end of the low-tension winding is brought to an outside terminal located on the right-hand side of the breaker, viewed from the breaker end. This terminal is marked —|—, indicating the positive connection from the positive lead from battery. Care must be taken to see that when the magneto terminals are marked — negative or —|— positive, that the battery be thus connected else demagnetization of the magnets will result.

### Disassembling Impulse Starter

The Teagle impulse starter is easily disassembled and reassembled which will only be necessary should the starter spring break. To **remove impulse starter** back off nut on rotor shaft, using a socket wrench. **Remove lock washer and flat washer.** The starter will have to be held to remove the nut. Place the tip of blade of screw driver in the slot of the ratchet case (half of case next to magneto) and place blade against stud of spring lever. Hold firmly while backing off screw. Pry off starter by placing a screw driver on each side of case and exert a uniform pressure.

**Separate the ratchet and case, remove long spring** but do not disturb the buffer or short spring. It should be located on the right side of pin as shown in an accompanying illustration. Place case in vise and **insert new long spring** as shown. **Raise end of long spring** next to bumper spring. **Set ratchet over spring with pin** adjacent to raised end of long spring, turn ratchet to left and press down at same time. This will bring the case and ratchet together and with the pin between long and bumper spring. The case should be packed with grease before assembling. Replace starter on rotor shaft. **Replace flat washer and lock washer and nut.** Tighten nut.

**A. H. Snyers**, 10 Place St. Denis, Liege, Belgium, desires to represent American manufacturers of automobile accessories in Belgium. Mr. Snyers would like connections with manufacturers of tires, spark plugs, motorcycles, fire extinguishers, etc. Mr. Snyers can give good banking references.



To Reassemble Impulse Starter Place Case in Vise and Start in Long Spring (B). Then Raise End of Long Spring (A) and Slip Ratchet With Pin Between Raised End of Long Spring and Bumper (C), and Press Halves Together With Twisting Motion to Left



## Proper Method of Overhauling Hartford Joints

**T**HE following are the factory methods of disassembling, replacing parts and reassembling the Hartford universal joints, made by the Hartford Automotive Parts Company, Hartford, Conn. Three types, Nos. 380, for trucks of 1½-ton capacity; 450, for 2½-ton trucks, and 585, for 3¼- to 5-ton trucks, are described and illustrated. Types 380 and 585 are similar, differing only in the method of retaining the shutter. Type 450 is easily identified after the casing and shutter are removed as the center block has a retaining ring which is locked in place by two retaining pins.

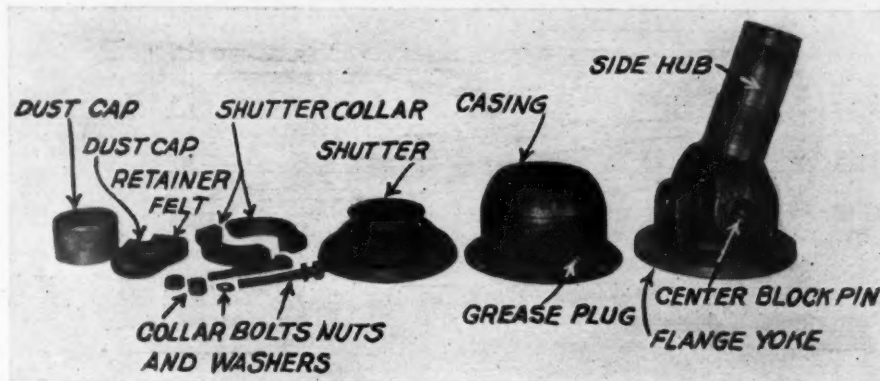
### Disassembling No. 380 Joint

No directions are given for removing the joint from the shaft other than the suggestion that care be exercised in removing the bolts from the flange yoke of the first joint to be freed from the unit to which it is attached. Some method of suspension should be adopted for the shaft, so that it will not drop and strike the floor while the bolts are being removed. This precaution is necessary to avoid the possibility of the shutter or casing being injured. It may be explained that the former holds a packing which acts as a seal and prevents foreign elements entering the joint.

To completely disassemble the No. 380 joint, place it on the bench and remove

Back off the shutter collar bolt nuts (2), remove lock washers and bolts (2). Remove shutter and casing. Note—In replacing shutter collar bolts the lock washers are slipped on the bolts as they go next to the head of the bolts.

right-hand thread and by unscrewing pin the nut and lock washer will be displaced. Drive out the long pin. An accompanying illustration shows this pin partly removed, also the center block pin bolts. Lift off the slip hub.

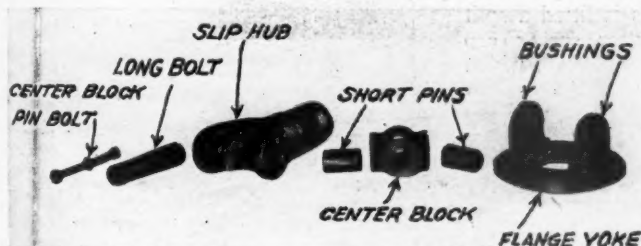


The Hartford Universal Joint, No. 380, Partly Disassembled and Showing From Left to Right the Order of Disassembly

The parts are: A, dust cap; B, felt; C, retainer; D, shutter collar; E, shutter collar bolts, nuts and washers; F, shutter; G, casing; H, slip hub and yoke assembly with long and short pins

The slip hub has two bushings and a long pin extends through the hub and center block. There is a long pin with castellated nut and lock washer that extends through the slip hub, short pins and long, preventing movement of latter. Back out center block pin bolt, using a screw driver. Remove pin. The pin has a

The center block is supported in the flange yoke by two short pins and the yoke has two bushings. To remove short pins insert a long drift pin through the larger hole (outer end) of the short pins and drive out the other pin. The pin is driven out; that is, from the inside. Drive out remaining short pin. The joint is now completely disassembled with the exception of the bushings. Examine these and if badly worn replace with new ones. If long and short pins are badly worn and too much play exists, renew these. In fitting new bushings they should be pressed in. The bushings have a shoulder and the shoulder must be on the inside of flange yoke and slip hub. An accompany-



The Slip Hub and Yoke With Pins and Center Block

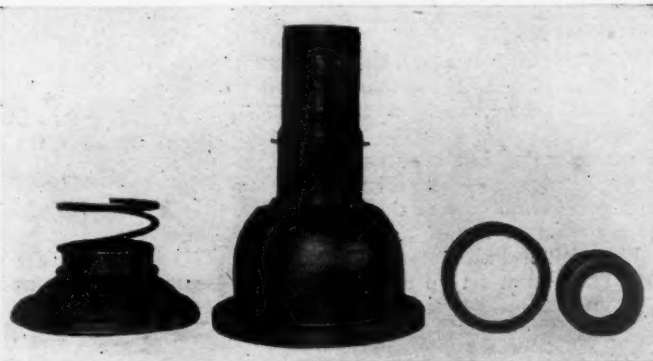
From left to right: Center block pin, long pin, slip hub, short pin, center block, short pin, flange yoke.

the dust cap. It has a right-hand thread and has a felt and a metal retainer. If the felt is badly worn or hard, and if soaking in gasoline or kerosene does not remove the grease, etc., it is best to use a new felt.

The shutter and casing are mounted on the slip hub and the former is held in place by a shutter collar (in two sections).

### The No. 585 Joint With Shutter and Coil Spring Displaced, Also the Shutter Spring Cap and Dust Cap

The shutter spring cap collar is shown inserted in slot in slip hub to show its normal position.



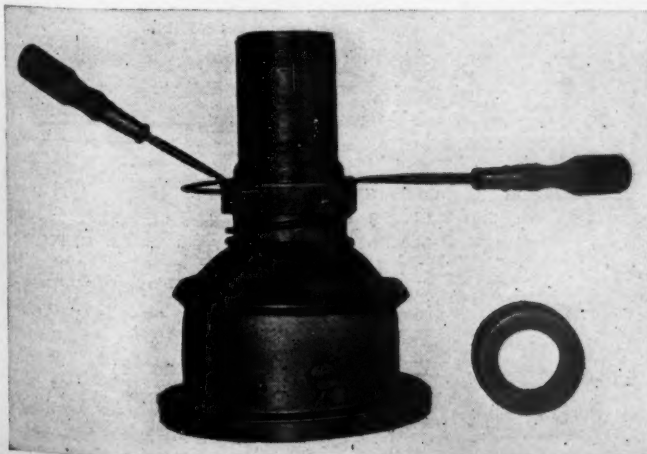
Shutter Spring Cap of the No. 585 Joint is Locked by a Split Ring.

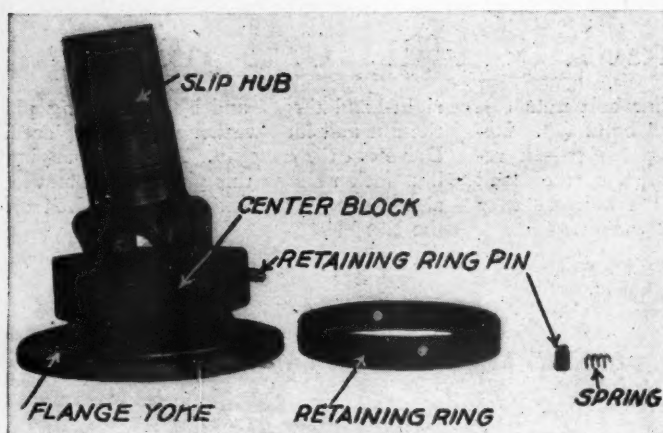
The illustration indicates how screwdrivers may be used to compress shutter spring when removing the halves of the lock ring.

ing illustration shows the joint completely disassembled and the proper location of the bushings with reference to their shoulders.

### Lubrication of Pins, Etc.

**BEFORE REASSEMBLING THE JOINT CLEAN ALL PARTS THOROUGHLY.** The short pins, and the long one, should be dipped or smeared with Gredag or 600 W before inserting in the yoke and hub, and it is advisable to lubricate the bushings into which the pins are inserted.



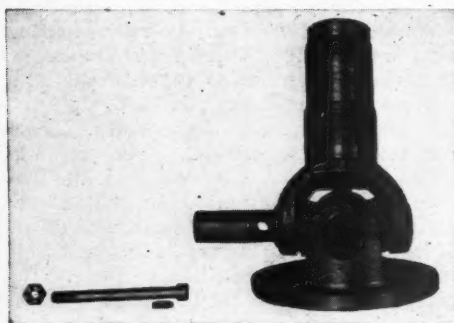


Showing the No. 450 Joint With Retaining Ring Removed  
One of the retaining pins and springs is shown displaced from center block, also a pin in the block



The Hartford Universal Joints. From Left to Right  
Numbers 380, 450 and 585

To reassemble joint place center block in flange yoke with its open end upward and drive in a short pin. Insert other short pin. Use a lead or bronze hammer for driving in the pins. Replace long pin. When inserting this pin start it so that its opening will register with the holes in the short pins. An accompanying illustration shows proper way to start pin. Drive in long pin. Insert center block pin bolt,



Showing the Center Block Pin Removed  
and Hole in Short Pin

The long pin is shown partly removed, exposing the hole through which center block pin extends. In replacing long pin its hole must register with hole in short pin.

with lock washer next to its head, catch castellated nut, and tighten nut. Pack joint with grease, using about 5 ounces by weight.

Replace casing but in so doing see that the grease plug opening registers between the slip hub and hub of the flange yoke. Replace shutter. Attach the shutter collar and bring the halves together by their bolts, but do not set up bolts tight. The

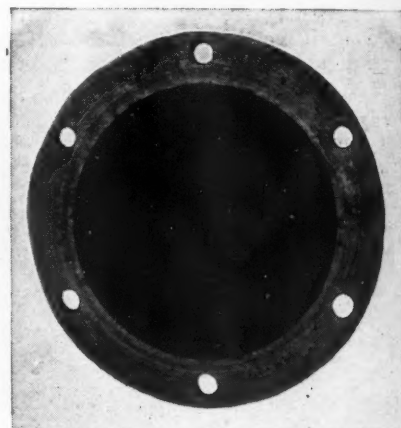
shutter collar is threaded internally and is screwed down on the lower threaded part of the slip hub. Screw down shutter collar until the shutter makes a firm fit on casing but not too tight. The shutter should move freely but should be tight enough to prevent the escape of the lubricant and to prevent entrance of foreign elements. Rock the slip hub back and forth and note adjustment of shutter and casing. Tighten collar bolts. Replace dust cap with felt and retainer. Screw up to a snug fit.

The No. 585 joint is constructed in the same manner as the 380 differing only in that the shutter's contact with casing is maintained by a coil spring and the dust cap is not adjustable. The slip hub is grooved and in the recess is fitted a split ring known as the shutter spring cap collar. The dust cap has a flange, which with the pressure of the spring, against the split ring, prevents movement of the latter. To remove the split ring press down on the dust cap until its top is well below the ring and remove the ring. An accompanying illustration shows how use can be made of screw drivers for removing the ring and also shows one section of the ring partly removed. Remove dust cap, shutter and casing. To disassemble the joint proceed as with the No. 380. The 585 differs from the 380 in that the grease plug in the casing is cotter-pinned.

#### Construction of No. 450 Joint

In the disassembly of the No. 585 joint observe the same directions as with the 380 insofar as the removal of the shutter collar, shutter and casing, except dust

cap, which is locked by a screw. The center block of the 585 differs from the types described in that it is a circular member and the long and short pins are positioned by a retaining ring. This ring is fitted over the center block and has two holes through which retaining ring pins extend, locking the retaining ring in place. These pins are inserted in recesses in the



A View of the Flange Yoke of the No. 450 Joint, Showing the Long and Short Pins in the Center Block

center block and have a spring in back of them. As may be noted by an accompanying illustration showing the retaining ring removed and a pin and spring displaced from the center block, one end of the pins is less in diameter than the body of the pin. The diameter of the holes in the ring is equal to that of the small end of the pin. This construction locks the pin and the ring.

#### Removing Retaining Ring Pins

To remove the retaining ring press in both pins, using a punch in either hand, and slip off ring. Remove retaining ring pins and springs. The long pin is next driven out, then the short pins. These are not supported by bushings. In replacing the pins, dip or smear them with Gredag or 600 W and lubricate the bearing parts of the slip hub and flange yoke. To replace retaining ring insert springs and pin in center block, push these in and replace retaining ring. Replace casing, spring, shutter and dust cap. Push down on dust cap until top is below ring groove



The No. 585 Joint Partially Disassembled and Order of Disassembly  
The head of the center block pin is shown in one of the short pins



in slip hub and **replace retaining or lock ring**. Release pressure and the dust cap is locked in place.

#### Lubrication of Joints

Lubrication of the Hartford universal joints, or the renewal of the lubricant with the truck in service, is through the filler openings in the casing. The supply should be renewed every 2000 miles of service. The amount to be used in the reassembly of the joints is as follows:

No. 380 .....	5 Ounces
No. 450 .....	11 Ounces
No. 580 .....	13 Ounces

In replacing the joint with shaft in the

The Shutter Removed to Show the Shutter Packing. A Short Pin With Its Bushing is Also Shown.



chassis care should be taken to see that the flange bolts are set up tight and that the contact surfaces of the flange yoke and casing are clean.

## Italian Makers Favor Pneumatics for Two and a Half Tonner

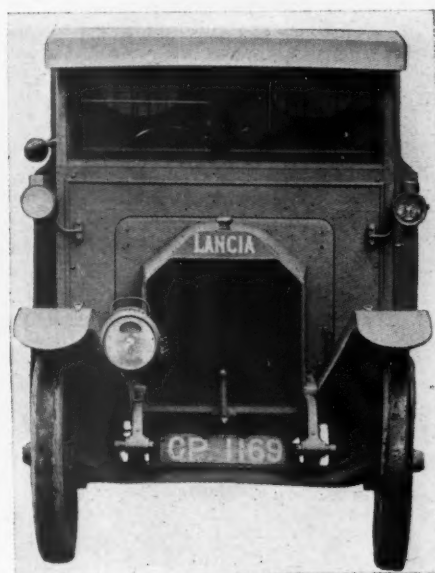
**O**RIGINATED by the well-known Italian racing driver Lancia, the private automobiles bearing his name have long been known in Europe, but during the war the Lancia people embarked on the construction of a 2½-ton truck which did good service with the Italian armies, and is now energetically being put on the European market. Already it has reached France and Great Britain, where it is represented by the West End Motor Co., Halifax, Yorks, England.

But though a fair sized truck chassis, as a whole the Lancia partakes more of the private automobile than the truck, for in advance of general European practice it has been designed for exclusive use on pneumatic tires, and so is markedly lighter than would be possible if run on solids. The tires measure nearly 35½ x 5 5-16 in., or as catalogued in the metric system which is employed in Europe, 935 mm x 135 mm. The dual pneumatics used on the back wheels of this job is a departure from the American practice.

As a whole the chassis follows usual practice, with a live back axle, bevel driven from a propeller shaft having a plunging joint at the back end and an ordinary coupling at the front. The chief characteristic at this part is the pressed steel torque rod, pivoted at its front end to a spring swivel joint and at its back end, bolted between the two halves of the axle casing, which is jointed vertically.

This arrangement renders encasement of the propeller shaft unnecessary.

A four-speed gear box in unit with a 4-cylinder engine, having a bore and stroke of 4 5-16 x 5½ in., respectively,



The Standard Cab is Especially Comfortable

complete the general specification on accepted lines.

Nevertheless, numerous original features call for attention. The one having

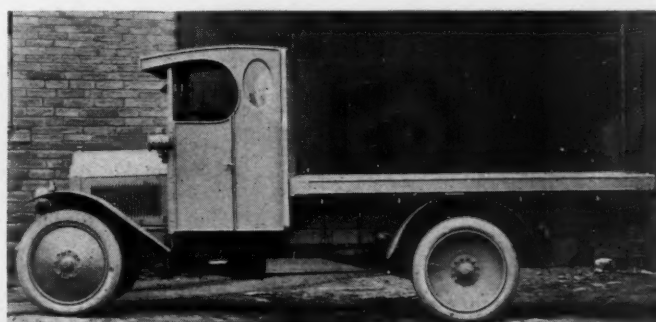
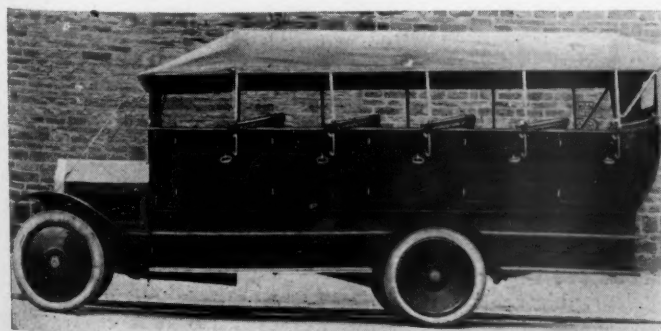
the greatest potential value is found in the water connections. These are made so as to distribute the water as it enters both cylinders and radiator so that the cooling system in the one, and the flow of hot water in the other, are well distributed over the surfaces which they have to affect. Incidentally, the arrangement of the water pump under the left front engine support and the carrying of the water connections through the support is at least unusual.

The hand brake acts on the back wheels, but the foot brake on the tail end



This Sketch Explains How the Hot Water From the Engine is Distributed to All the Radiator Tubes by a Splayed Water Connection With the Tank.

of the gear box shaft. The latter exhibits a distinctly original arrangement: it practically amounts to a roller chain surrounding the drum, and loosely attached to the brake blocks, so that when operated the chain is tightened to the blocks, contracting them against the drum.



These Pictures Show the Two and a Half Ton Pneumatic-Tired Lancia Chassis Equipped Respectively for Freight and Passenger Traffic

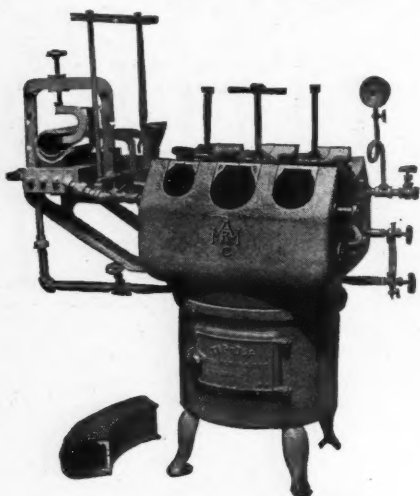
## Service Station and Repair Shop Appliances

### Improved Vulcanizers and Retreaders

The Akron Rubber Mold & Machine Co., Akron, Ohio, recently made improvements in its line of vulcanizers and retreaders.

The improved type, A, is a new equipment recently developed for repairing cord tires. It is a three-cavity outfit, accommodating all makes of cord and fabric up to 5 in. It is equipped with a tube plate and a self-contained steam boiler.

The type F is an ideal equipment for the small shop, and is a self-contained



**Improved Akron Type A Mold**

This three-cavity outfit which accommodates cord and fabric tires up to 5 in.; has a tube plate and a self-contained steam boiler

outfit handling all makes and sizes of fabric tires from 2½ to 5 in. It is a complete unit equipped with tube plate and inside patch vulcanizer attachment, and fitted with steam boiler so that a separate steam boiler is not necessary. It has two cavities, one 3½-4 in. and one 4½-5 in., the smaller cavity being fitted with a reducing shell for taking 2½-3 in. size tires.

The improved type, E, is a cavity retreader and has been developed to especially accommodate 5-in. cord tires, which are larger in size than 5-in. fabric tires. It has a two-cavity outfit, on which all makes of tires from 3-in. up to 5-in. cord and fabric can be handled. It is equipped with a self-contained steam boiler. Plain ribbed or non-skid tires can also be handled on this equipment. In addition to the equipment just described, the Akron Rubbermold line includes several other types of vulcanizers as well as tube plates, bead molds, reducing shells, air bags and steam boilers, buffing stands, lasts, brackets, etc., and a full line of tire repair tools.

### Rustsolvo

A new solution that will disintegrate rust, freeing parts that have been rusted together, is being offered to the trade by

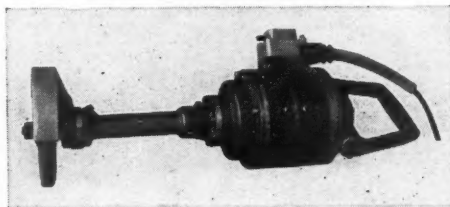
the Advance Packing & Supply Co., 64 East Lake St., Chicago, Ill., general distributor. This liquid, which is known as Rustsolvo, is the product of the Rust Products Co., 64 East Lake St., Chicago, Ill.

It is stated to be a free-flowing liquid, utterly harmless, non-inflammable, and pleasant smelling. It dissolves rust, red or white lead, paint, tar, grease and dirt. It cuts any deposit of carbon graphite, shellac or green corrosion on batteries. It acts quickly, and without any injury to rubber, metal or wood. Only a few drops are necessary.

### Van Dorn Electric Aerial Grinders

The improved direct current aerial ball bearing grinder, now being produced by the Van Dorn Electric Tool Co., Cleveland, O., is designed with a 12-in. extension. It is adaptable for all kinds of light grinding around machine shops, drop forge shops, auto body work, dressing off gas and arc-welds, grinding body work, grinding castings, polishing bronze and brass signs, and polishing art metal work, etc. Its complete equipment consists of one 6 x 1 x ½-in. wheel, wheel guard, 10 ft. of electric cable with attachment plug, and suspension spring.

The motor structure has been increased from 1-3 hp. to ½ hp., A. I. E. E. rating, permitting the use of a 1-in. face-wheel. The motor housing, extension spindle housing, and end plate are steel.



**Improved Van Dorn Electrical Grinder**

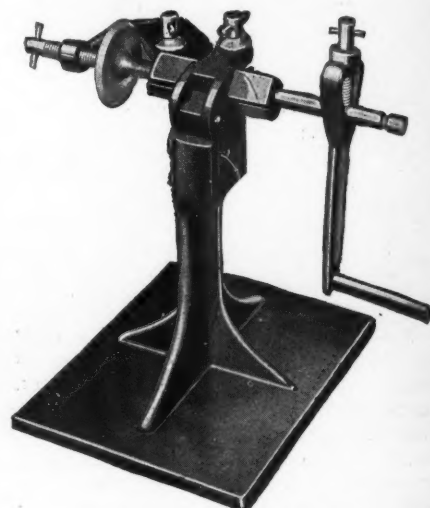
Following are specifications: voltage, 115; speed, 4000; overall length, 24 in.; weight, 31 lb.; telegraphic code, Chevalier. Voltage, 230; speed, 4000; overall length, 24 in.; weight, 31 lb.; telegraphic code, Champion. The following are specifications of the Van Dorn electric aerial grinder:

The 60-cycle alternating current aerial grinder is similar in A. I. E. E. rating, and the motor housing is aluminum, while the end plate and extension spindle housing, where greatest strength is required, are steel. Its specifications are: voltage, 110; speed, 3600; wheel, 6 x ½ x ½ in.; extension, 12 in.; overall length, 32 in.; weight, 26½ lb.; telegraphic code, Boston. Voltage, 220; speed, 3600; wheel, 6 x ½ x ½ in.; extension, 12 in.; overall length, 23 in.; weight, 26½ lb.; telegraphic code, Boston.

### Universal Valve Refacing Tool

A valve refacing tool, which not only refaces worn valves quickly, but also saves time in grinding valves, is a new product of the Universal Equipment & Supply Co., 325 West Fayette St., Syracuse, N. Y., and which is distributed by the Fairbanks Co., New York City.

This tool is known as the Universal valve refacer, and with it a valve may be placed in the refacer or taken out without the use of tools. This tool refaces any valve of any degree of hardness or size.



**Universal Valve Refacer**

Trims up worn valves and also assists in valve-grinding

It takes valve stems from ¼ to ½ in., and heads from 1 to 3½ in. in diam.

The "V" channel type bearings, anchored in the center, hold any valve, including motorcycle valve stems that are smaller at the bottom than at the top. With this device a valve can be refaced in two minutes. It permits roughing out badly pitted valves before grinding, thus saving from one to two hours time. This tool is guaranteed to successfully reface rich tungsten valves. It is packed complete with a four-edge cutting tool, giving 6 in. of cutting surface and sells at \$7.50.

### Cowie Cadmium Test Set

The E. S. Cowie Electric Co., Kansas City, Mo., recently added a new battery test set to its line. This outfit is the cadmium test set, and consists of cadmium prods and a voltmeter, produced by the Reliance Instrument Co., for recording the voltage.

When testing, the cadmium is placed in the acid or electrolyte of the battery and allowed to stay a few minutes so that the coating may form before the first reading is taken. The perforated rubber is used to prevent the cadmium from coming in contact with any one of the



plates for connection. The rubber should extend beyond the end of the cadmium prod, which should be attached to the negative post of the low reading voltmeter. Cadmium reading is taken when



Cowie Cadmium Battery Testing Outfit

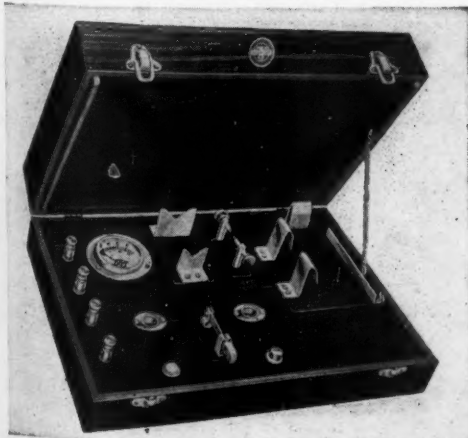
the battery is being charged at the normal rate, being approximately one ampere per positive plate. The price of cadmium prods is \$3 and of the low reading voltmeter \$8.

### Niehoff Mag-Charger

The Niehoff Mag-Charger, manufactured by Paul G. Niehoff & Co., Inc., 232 E. Ohio St., Chicago, Ill., has been specially designed for recharging Ford magnetos and burning out shorts in the magneto case. This is accomplished successfully in but a few minutes by an ordinary mechanic.

This apparatus is also a complete electrical testing outfit. With it quick electrical service can be rendered with that definite determination, which appeals to the motorist.

When this outfit is arranged in a permanent place, all that is necessary is to run the Ford alongside of it and in less than fifteen minutes the work of recharging, burning out all shorts, and making an entire test of the ignition system can be accomplished. Full directions accompany each instrument. The entire equipment including cables with terminals is listed at \$60.



Niehoff Ford Recharging Outfit

### Assembling and Disassembling Stand

In the line of service repair shop equipment of the Carswell-Hammond Mfg. Co., Boone, Iowa, is an assembling and disassembling stand, and apparatus to facilitate the handling of the Ford engine when making repairs.

It permits unhampered freedom and ready accessibility in the performance of all work. With this stand the following work may be done conveniently: the complete engine assembled, the valves may be ground, piston and rings fitted,



Ford Engine Repair Stands

Accessibility to all parts of the Ford engine is afforded when mounted on this Carswell-Hammond product

camshaft may be taken out or replaced, cylinder head bolts drilled out, transmission cover may be taken off or replaced, the crankcase may be taken off or replaced, timing gears matched or fitted, etc.

The engine is held in the stand by the two V type supports, which fit into the cavities of the first and fourth cylinders, while the three-finger spider fits up against the engine and is held with a wing nut.

### Bench Plate for Ford Engine

One of the many devices for automotive repair work, produced by the Carswell-Hammond Mfg. Co., Boone, Iowa, is a bench plate for holding a Ford engine.

This bench plate can be bolted to any bench. The engine is held in position in the same manner as in the Engine Bench Stand, another product of this company only, instead of turning from one side to the other, it revolves. A 3-in. pipe is cast in the head and fits into a split boxing, and a wing nut is used to

tighten down on the pipe, this holding the plate in any desired position. This makes a very handy bench plate for overhauling an engine, permitting the handling of the complete engine, less the crankcase.



Carswell-Hammond Bench Plate

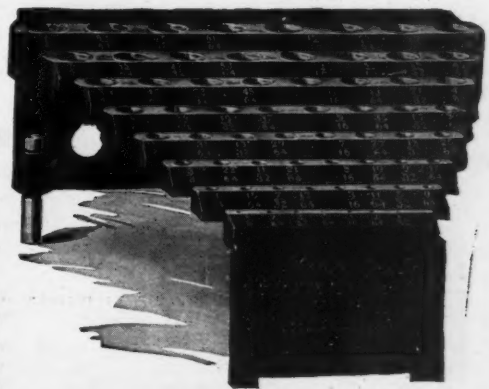
This Ford bench plate can be bolted to any bench

### Peerless Gauging Drill Rack

The systematic arrangement and the small storing space required, are the features of the Peerless gauging drill rack, manufactured by the C. H. Driver Co., Racine, Wis., and marketed by the Peerless Machine Co., Racine, Wis.

There is a special place for each drill according to size, and like a limit gauge, a small drill falls through or a large drill cannot enter, if placed in a hole other than its own. This feature saves loss, or the time spent in finding a mislaid drill, and also the trouble of calipering, micrometering or gauging, when in doubt of the size.

It is sectional in construction, and interchangeable units permit the assembly of a rack to meet any need. It may be built up in practically any combination, and may be expanded sideways, up and down, or straight out. The 64th, 32nd and 16th sizes occur one above the other. It holds fractional size drills from 1-16 in. to 1 1/4 in. in diam. There is a space for three drills of each size provided, in sizes of 1-16 to 1/8 in. inclusive, two drills from 9-64 in. to 3/8 in. inclusive, and one drill only above 3/8 in. in diameter.



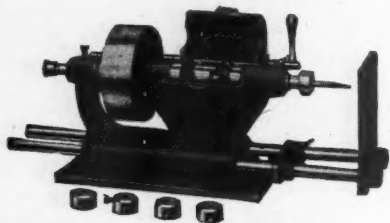
Peerless Gauging Drill Rack

It can be attached on a side wall or placed on a bench. It retains drills in systematic order, avoiding shop confusion

### Tapping Machine

The Workwell tapping machine, manufactured by the Workwell Engineering & Mfg. Co., 616-20 West Monroe St., Chicago, Ill., is made in two sizes, models B2 and C2.

These machines are designed with two-bar slides to hold work straight with the taps. The steel gears, 2 in. diam., are enclosed and run in oil. They also have extra large hardened clutches. One loose pulley with a hardened clutch, non-slip tap holders, a die holder for threading outside threads, and a stop adjustment



**Workwell Tapping Machine**  
Made in two sizes, type 1B2 and type C2

for any depth of thread. Type B2 machine cuts threads to  $\frac{1}{4}$  in. diam. and type C2 threads to  $\frac{1}{2}$  in. diam.

### Rotary Rasp

The Sanport rotary rasp, manufactured by the Sanport Co., 420 Murphy Bldg., Indianapolis, Ind., is a time-saving device for removing the old rubber from the place to be repaired. The band is made of specially heat-treated steel and the centers are accurately machined and



**Sanport Rotary Rasp**

Is used to remove old rubber from that portion of the tire to be repaired.

interchangeable. It is 7 in. diam. and has a 2-in. face, seven sharp teeth in each row, each tooth being in perfect alignment. It can be used on any buffing stand at high speed. It sells at the following prices: Rasp complete, each \$15; rasp band only, each \$11; rasp centers only, pair, \$4.

### Hydrometer Syringe With Celluloid Guides

The Master hydrometer syringe, a battery solution testing instrument, incorporates new construction principles. It was recently introduced by its manufac-



**Improved Hydrometer Syringe**  
Celluloid rings which circle the float prevent the float from adhering to the side walls of the glass barrel

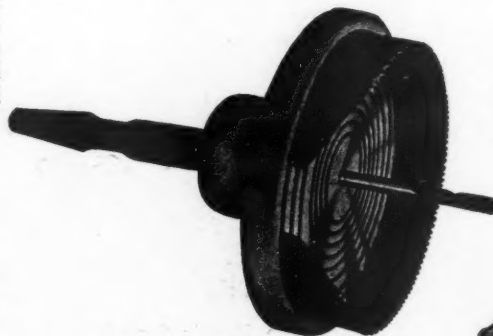
turer, the Beckley-Ralston Co., Chicago, Ill.

Celluloid guides, one of the new improvements, are used to overcome the tendency of the float to tip against the sides of the glass tube and stick. These rings, with their projecting fingers, are attached to the float, and rest lightly against the side of the test tube, holding the float erect and enabling it to ride freely. The glass barrel is extra large and of heavy glass. Large soft rubber rings at each end afford protection against breaking, should the instrument be dropped accidentally. Another entirely new instrument, known as a radiator anti-freeze solution tester, will soon be offered to the trade as production is expected to commence on it in the autumn. It is built on the same free-floating system as the Master hydrometer, and gives the driver exact knowledge of the strength of the battery solution at different temperatures.

### Rotary Hacksaw

The Misener rotary hacksaw is a tool for cutting round holes in metal, wood and various other kinds of materials. It is light, portable, and a worthy asset to any tool kit.

This hacksaw saves much labor and time when drilling, filing and reaming, as it cuts through easily and makes a clean,



**Misener Rotary Hacksaw**

This tool cuts various sized holes in metal or wood. It is especially useful when attaching speedometer or other instruments to the dash.

perfect round hole, which requires no finishing.

For the garage and service station it is especially useful as a labor saver, when used for cutting holes for the installation of speedometer and other instruments. By grinding worn blades to an edge, an ideal gasket cutter is available. This hacksaw may be operated by hand or used attached to an electric drill. It is distributed by Barnes & Irving, Inc., Syracuse, N. Y.

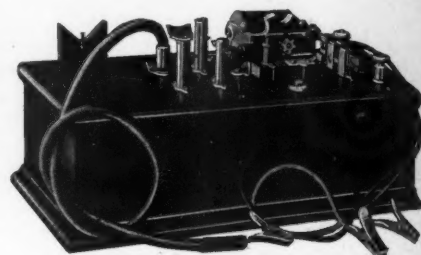
### Igni-Test, Trouble Finder and Ignition Tester

Igni-Test is an ignition testing outfit, which permits quick location of ignition troubles without the need of removing the magneto or coil. It is manufactured by the Testall Electric Mfg. Co., San Antonio, Texas.

Spark plugs, condensers and insulation tests can be made. This instrument contains no delicate meters or mechanism likely to burn out or function improperly, and

furthermore it is maintained that wrong connections will not effect injurious results. The instrument case is made of birch, mahogany finish with ebony finish instrument board. The working parts are made of steel with all steel and iron parts Parkerized against rust. The interrupter is fitted with platinum iridium contact points, and is mechanically operated by a small electric motor.

Included with each outfit is a special attachment for testing Ford coil units, connecting cable, and an instruction book with detailed drawings and information



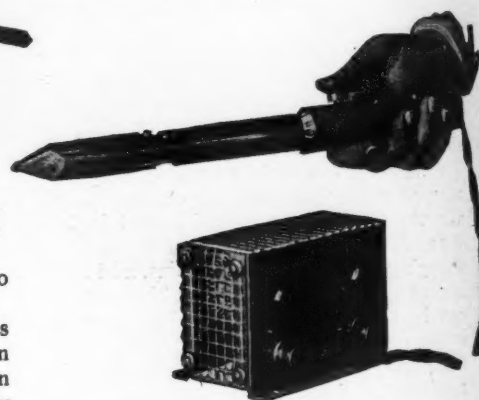
**Igni-Test Trouble Finder**

This instrument locates and determines what the trouble in the electrical system may be

on "How to Test All Types of Magnetos and Spark Coils." It sells at \$35.

### Electric Soldering Iron

A new tool very useful in a garage repair shop or service station is the Baco electric soldering iron, product of the Baco Electric Co., Bode, Ia. This de-



**Baco Electric Soldering Iron**

This outfit complete includes a rheostat

vice is made to operate from any electric light socket and on either D. C. or A. C. 110 or 220 volts.

The head of this iron is the same size as the conventional soldering iron. A double safety throw switch on the iron handle breaks the circuit and arc in one operation. The iron is heated by means of a carbon arc within the copper head. Solder is claimed to flow within 40 sec. from the time the current is turned on in the iron. By placing a 15 amp. fuse in the fuse block, it can be attached to any electric socket and soldering started. This iron is made of seamless steel tubing, nickel-plated, and has a copper head with a detachable tip.



**Note: Under Carburetor Inlet Diameter will be found either the size of the main air intake or the gasoline fuel line**

[illegible]











# KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Pages Following

In all Specifications { O—Own  
Op or Opt—Optional

<b>Engine:</b> Beav—Beaver Cont—Continental GBS—Golden, Belknap & Swartz Her—Hercules Hin—Hinkley HSp—Herschell-Spillman LeR—Le Roi Lib—Liberty LMF—Light Mfg. & Fdy. Lyc—Lycoming Rut—Rutenber Ster—Sterling TC—Twin City Vict—Victory Wau—Waukesha Wei—Weidely Wis—Wisconsin	<b>Valve Arrangement:</b> H—Overhead L—ELL-Head T—TEE-Head S—Sleeve	<b>How Cooled:</b> A—Air C—Centrifugal G—Gear Pump T—Thermo-Syphon	<b>Radiator (Make):</b> BW—B & W Brm—Brenem Bus—Bush Can—Candler Chic—Chicago EM—English-Mersick Eur—Eureka Fed—Fedders Flex—Flexo GO—G. & O. Har—Harrison Hoo—Hooven Idl—Ideal Jam—Jamestown Kuc—Kuenz Liv—Livingston Lug—Long McC—McCord May—Mayo Per—Perfex R-T—Rome-Turney Spar—Spartan Spec—Special Spi—Spirex Stan—Standard	<b>Radiator (Type):</b> C—Cellular H—Honeycomb	<b>Universal:</b> DP—Dry Plate WP—Wet Plate WD—Wet Disc DD—Dry Disc Fr—Friction	<b>Ignition System:</b> Aer—Aero AtK—Atwater-Kent AuL—Auto-Lite Bos—Bosch Ber—Berling Con—Connecticut Del—Delco Dix—Dixie Eis—Eisemann Exi—Exide Kin—Kingston KW—K. W. Ignition Co. Lor—Lorraine NE—North East POL—Prest-O-Lite Rm—Remy Sim—Simms Spl—Splendor Wag—Wagner Wes—Westinghouse	<b>Engine Starter:</b> AC—Allis-Chalmers AL—Auto-Lite BJ—Bijur DL—Delco Dy—Dyneto GD—Gray & Davis LN—Leece-Neville NE—North East RE—Remy WG—Wagner USL—U. S. L. W—Westinghouse	<b>Gearset:</b> B-Li—Brown-Lipe Cott—Cotta Covt—Covert D-Sea—Driggs-Seabury Det—Detroit Dun—Dundore Durst—Durstion Full—Fuller G-Le—Grant Lees MM—Mechanics Mach. Co. Munc—Muncie Rock—Rockford Warn—Warner	<b>Clutch (Make):</b> B. B.—Borg & Beck Det—Detlaiff Full—Fuller D. G.—Detroit Gear & Mach. Hart—Hartford B-Li—Brown-Lipe M-E—Merchant & Evans Munc—Muncie Covt—Covert War—Warner	<b>Clutch (Type):</b> D—Disc C—Cone	<b>Universal:</b> Russ—Russel Sals—Salsbury Sav—Savage Shel—Sheldon S-Par—Stan-Par Thom—Thomson Tim—Timken Torb—Torbensen W-M—Weston-Mott US—United States Walk—Walker Wis—Wisconsin	<b>Rear Axle (Type):</b> Flot—Floating 1/2-F1—Semi-Floating 3/4-F1—3/4-Floating D—Dead	<b>Steering Gear:</b> CAS—C. A. S. Products Co. Gem—Gemmer Jac—Jacox Lav—Lavine Ros—Ross War—Warner Woh—Wohlrab	<b>Wheels:</b> Arc—Archibald AuW—Auto Wheel Bim—Bimel Cla—Clark Day—Dayton Det—Detroit E&O—Eberly & Oris Hay—Haynes Hoo—Hoopes Brothers Jon—Jones Kel—Kelsey Mut—Mutual Pru—Prudden Roy—Royer Rus—Russell Sal—Salsbury Sch—Schwartz Smi—Smith Sta—Stanwell StM—St. Mary Stn—Standard Wal—Walker Wan—Wayne W-L—Waterhouse & Lester	<b>Rim Equipment:</b> Bak—Baker Det—Detroit Fir—Firestone Gdy—Goodyear Jax—Jaxon Kel—Kelsey Stn—Stanweld
<b>Engine:</b> Beav—Beaver Cont—Continental GBS—Golden, Belknap & Swartz Her—Hercules Hin—Hinkley HSp—Herschell-Spillman LeR—Le Roi Lib—Liberty LMF—Light Mfg. & Fdy. Lyc—Lycoming Rut—Rutenber Ster—Sterling TC—Twin City Vict—Victory Wau—Waukesha Wei—Weidely Wis—Wisconsin	<b>Valve Arrangement:</b> H—Overhead L—ELL-Head T—TEE-Head S—Sleeve	<b>How Cooled:</b> A—Air C—Centrifugal G—Gear Pump T—Thermo-Syphon	<b>Radiator (Make):</b> BW—B & W Brm—Brenem Bus—Bush Can—Candler Chic—Chicago EM—English-Mersick Eur—Eureka Fed—Fedders Flex—Flexo GO—G. & O. Har—Harrison Hoo—Hooven Idl—Ideal Jam—Jamestown Kuc—Kuenz Liv—Livingston Lug—Long McC—McCord May—Mayo Per—Perfex R-T—Rome-Turney Spar—Spartan Spec—Special Spi—Spirex Stan—Standard	<b>Radiator (Type):</b> C—Cellular H—Honeycomb	<b>Universal:</b> DP—Dry Plate WP—Wet Plate WD—Wet Disc DD—Dry Disc Fr—Friction	<b>Ignition System:</b> Aer—Aero AtK—Atwater-Kent AuL—Auto-Lite Bos—Bosch Ber—Berling Con—Connecticut Del—Delco Dix—Dixie Eis—Eisemann Exi—Exide Kin—Kingston KW—K. W. Ignition Co. Lor—Lorraine NE—North East POL—Prest-O-Lite Rm—Remy Sim—Simms Spl—Splendor Wag—Wagner Wes—Westinghouse	<b>Engine Starter:</b> AC—Allis-Chalmers AL—Auto-Lite BJ—Bijur DL—Delco Dy—Dyneto GD—Gray & Davis LN—Leece-Neville NE—North East RE—Remy WG—Wagner USL—U. S. L. W—Westinghouse	<b>Gearset:</b> B-Li—Brown-Lipe Cott—Cotta Covt—Covert D-Sea—Driggs-Seabury Det—Detroit Dun—Dundore Durst—Durstion Full—Fuller G-Le—Grant Lees MM—Mechanics Mach. Co. Munc—Muncie Rock—Rockford Warn—Warner	<b>Clutch (Make):</b> B. B.—Borg & Beck Det—Detlaiff Full—Fuller D. G.—Detroit Gear & Mach. Hart—Hartford B-Li—Brown-Lipe M-E—Merchant & Evans Munc—Muncie Covt—Covert War—Warner	<b>Clutch (Type):</b> D—Disc C—Cone	<b>Universal:</b> Russ—Russel Sals—Salsbury Sav—Savage Shel—Sheldon S-Par—Stan-Par Thom—Thomson Tim—Timken Torb—Torbensen W-M—Weston-Mott US—United States Walk—Walker Wis—Wisconsin	<b>Rear Axle (Type):</b> Flot—Floating 1/2-F1—Semi-Floating 3/4-F1—3/4-Floating D—Dead	<b>Steering Gear:</b> CAS—C. A. S. Products Co. Gem—Gemmer Jac—Jacox Lav—Lavine Ros—Ross War—Warner Woh—Wohlrab	<b>Wheels:</b> Arc—Archibald AuW—Auto Wheel Bim—Bimel Cla—Clark Day—Dayton Det—Detroit E&O—Eberly & Oris Hay—Haynes Hoo—Hoopes Brothers Jon—Jones Kel—Kelsey Mut—Mutual Pru—Prudden Roy—Royer Rus—Russell Sal—Salsbury Sch—Schwartz Smi—Smith Sta—Stanwell StM—St. Mary Stn—Standard Wal—Walker Wan—Wayne W-L—Waterhouse & Lester	<b>Rim Equipment:</b> Bak—Baker Det—Detroit Fir—Firestone Gdy—Goodyear Jax—Jaxon Kel—Kelsey Stn—Stanweld

[illegible]



Independent F. (Ohio)  
International F.  
Keystone I  
Kleber AA  
Lone Star 9  
Macar S1  
Menominee HT  
Napoleon 9  
Napoli 26  
Nelson 4  
Nelson 4  
Noble 20  
Oak 2  
Oak B2  
Old History  
Patriot Reverse I  
Pioneer A  
Ranger R-9  
Republic 10  
Royal I G  
Sandow 20  
Service 20  
Shaw M4  
Signal F  
Southern 10  
Standard LK  
Stewart 12  
Superior D  
T-1  
Transport 20  
Tussock B  
V30  
White History E  
Whitaker  
Willow A

**1 1/4 Ton**  
Garford 25  
Indiana 12  
Koehler C  
Onida A-9

**1 1/2 Ton**  
Acason RB  
Ace  
Acme F  
Aerius 115  
All American 1 1/4  
Alex D  
Alto B2  
Afterburny 20R  
Available H 11 1/4  
Beck Hawk 2 B  
Bell E  
Belmont B  
Besemer H2  
Bethlehem G  
Brooklyn 82  
Capitol 33 1/2  
Chicago C1 1/4  
Clydesdale 42  
Collier 19  
Comet 11 1/4  
Commerce EP  
Concord A  
Corbett D  
Dart S  
Day Elder B  
Deaerborn F  
Defiance D  
Dependable C  
Diamond T  
Diamond T  
Douglas G-1 1/2  
Doris 14  
Erie 14  
Fagel 1 1/4  
Famous B-12  
Federal TE  
Forscher AX  
Front Drive C  
Gary GT  
Gerrit M  
GMC 31A  
GMC 31B  
Graham Bros Speed Truck  
Gramm Bernstein 15  
Gramm Bernstein 65  
Hahn 17A  
Hahn CD  
Harvey WEA  
Harvey K





[illegible]

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	P.R. Cent of Wt. Above Rear Wheel										
		Bore and Stroke	N.A.C.C.	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter		Make	Type				Total Gear Reduction in High	Total Gear Reduction in Low	Wheels (Make)		Rim Equipment					
																								Location	Speeds		Universal (Make)	Springs (Make)	Final Drive		
2 Ton—Con'd																															
White 20	3300	3 1/2 x 5 1/4	22.5	L	C	FS	Own	Own	G	Wau	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x7 1/2	36x6	55.45	39	36x4 1/2	36x6	Blm	Fir	4150 157	4700 144 80
Winch 20	2800	3 1/2 x 5 1/4	22.5	L	C	FS	Own	Own	G	Wau	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x7 1/2	36x6	55.45	39	36x4 1/2	36x6	Blm	Fir	4700 144 80	5800 150 80
Winch 49	3250	4 1/4 x 5 1/4	25.6	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x7 1/2	36x6	55.45	39	36x4 1/2	36x6	Own	Fir	4550 144 70	5800 150 80
Witt Will P	3150	4 1/4 x 5 1/4	27.2	H	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x7 1/2	36x6	55.45	39	36x4 1/2	36x6	Own	Fir	4550 144 70	5800 150 80
2 1/2 Ton																															
*Ace 2 1/2	3450	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	34	31	36x4 1/2	36x6	Ros	Ros	5630 156 80	6025 160 70
*All American 2 1/2	2395	4 1/4 x 5 1/4	25.6	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Apex E	3575	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Armstrong HW	2695	4 1/4 x 5 1/4	25.6	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Atco A	3675	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Atterbury 7CX LWB	3575	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Atterbury 7CX STD	3475	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Available 2 1/2	2750	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Bell O	2695	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Bethlehem H	3400	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Betz D2	3200	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Brockway K4	3450	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Capitol H 2 1/2	3850	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Capitol K 2 1/2	3250	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Chicago C 2 1/2	3775	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Clydale 65C	2850	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Columbia G	3400	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Concord B	3650	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Corbett B	3000	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Day Elder C	3150	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*DeKalb E 2 1/2	2600	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Dependable E	2950	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Doane 2 1/2	3900	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Erie 2 1/2	3150	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Fargo 3400	3500	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Garay K	3875	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Gramm-Bernstein 25	3300	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Hahn EE	3300	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Harvey WFA	3650	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Hendrickson I	3750	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Hewitt Ludlow	3350	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*H. R. L. H.	3350	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Hurlbut 2 1/2	3350	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2	36x6	Lav	Lav	4500 160 80	5000 168 70
*Independent H. (Ohio)	3450	4 1/4 x 5 1/4	28.9	L	C	FS	Own	Own	G	Pier	Own	D	Eis	W	Own	A	4	Own	Det	R	Own	36x8	36x6	27	27	36x4 1/2					



2795	*Republic 19	Cont C2	4 1/2 x 5 1/2	27.2 L	CCCC	Own	C	FS	Strm	Phar	Full	DD	Bos	W	Full	U	4	4	Spic	I	Torb	D	7	36.8	36x4	36x7	Pri	4150	144	75
3290	*Rowe CDW	Wau DU	4 1/2 x 5 1/2	28.9 L	CCCC	Fin	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Hoo	4500	162	64
3375	*Royal	Wau DU	4 1/2 x 5 1/2	28.9 L	CCCC	Fin	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Hoo	4500	162	64
3390	*Sanford W25	Wau DU	4 1/2 x 5 1/2	28.9 L	CCCC	Fin	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Hoo	4500	162	64
2950	*Schacht	Buda HTU	4 1/2 x 5 1/2	27.2 L	CCCC	Own	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stn	4500	165	70
2850	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb	1/2 Fl	7	36.8	36x4	36x7	Stm	4500	165	70
3100	*Schwartz CIL	Cont C4	4 1/2 x 5 1/2	27.2 L	CCCC	Fed	H	F	Strm	Sim	Mon	DD	Bos	Op	Full	A	4	4	Spic	I	Torb									

[illegible]

## 4 Ton

**4 Ton**  
American  
Bessemer  
Denby 27  
Double-I  
Highway  
Jumbo 40  
\*Kelly-Spr  
Kimball  
King Zei



4975	*Moreland 20G.	Cont B2	4 1/2 x 6	36.1	L	G	CC	Own	Fin	F	Mill	G	Con	B-Li	DD	D	Der	W	W	Thom	1/2 Fl	7.8	37.7	Ros	36x5	40x5 1/2	Sm	7810 1021
4700	*Riker BB.	Wau EU	4 1/2 x 6	28.9	L	V	G	Wau	Fin	FS	Shel	V	Wau	Det	DP	DP	Eis	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Hoo	7300 150 77
4350	*Rowe HW.	Wau EU	4 1/2 x 6	28.9	L	V	G	Wau	Fin	FS	Shel	V	Wau	Det	DP	DP	Eis	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Hoo	6370 156 77
4500	*Schwartz DW.	Buda YU	4 1/2 x 6	32.4	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	12	72	Ros	36x5	40x5 1/2	Sm	7700 156
4500	*Schwartz DW.	Buda YU	4 1/2 x 6	32.4	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	12	72	Ros	36x5	40x5 1/2	Sm	7700 156
3975	*Union H.	Wau EU	4 1/2 x 6	32.4	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Sm	6800 124 75
4595	*U. S. S.	Wau EU	4 1/2 x 6	32.4	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Sm	7600 168 85
4000	*Ware A.	Spe 2H	4 1/2 x 6	39.2	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Sm	7600 168 85
5150	*Anson M.	Wau EU	5 x 6 1/2	40	L	V	G	Wau	Fin	FS	Shel	V	Wau	Det	DP	DP	Eis	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Sm	8350 187
5150	*Anson M.	Wau EU	5 x 6 1/2	40	L	V	G	Wau	Fin	FS	Shel	V	Wau	Det	DP	DP	Eis	W	W	Thom	1/2 Fl	10.25	42.5	Ros	36x5	40x5 1/2	Sm	8350 187
5975	*Aubrey SE.	Cont B2	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9278 180 56
5575	*Available H5.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9340 167 98
5250	*Brookway T.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9500 190 90
5500	*Clydesdale 120B.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9800 174 70
5700	*Corbett AA.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9100 176 76
6000	*Couple AC.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9685 178 70
5350	*Day Elder E.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	11000 144 60
5750	*Diamond T-EL.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8590 170 80
5900	*Federal 5300.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8790 180
4750	*Federal XE.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8300 172 80
5150	*Garford 68.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8100 157 7.5
5875	*G. M. C. 101A.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8500 182
5875	*Gramm-Bernstein 50.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8485 163 75
5100	*Hall.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8655 187 75
5200	*Hahn FE.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9880 168 82.2
5400	*Hendrickson K.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8400 Op 65
5500	*Hewitt Ludlow.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8000 160 80
5075	*Hurlbut.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8650 159 90
5150	*Indiana 51.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	9000 170 76.8
5975	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8400 150 83
5085	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8400 Op 68
5600	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	7200 180 75
5500	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8800 186
5290	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8650 Op 68
5390	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8000 170 72
5440	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	8200 194 72
5540	*Kissel Goliath.	Wau EU	4 1/2 x 6	36.1	L	V	G	Con	Fin	FS	Shel	V	Con	B-Li	DD	DD	Bos	W	W	Thom	1/2 Fl	11.6	61	Ros	36x5	40x5 1/2	Sm	

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels																
		Make and Model Number unless otherwise noted	Bore and Stroke	N. A. C. C. Horsepower	Valve Arrangement	Flow Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make				Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	Front		Rear	Wheels (Make)	Film Equipment	
<b>5 1/2, 6, 7 Ton—Con'd</b>																																				
Own	5500	*Kelley-Springfield K60...	4 1/2 x 6 1/2	32.4	T	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	3	Own	Per	Mer	W	Own	D	12.39	45.2	Gem	36x6	40x7 1/2	StM	...	8900	150 93		
Wis RBU	5500	Maccac GI...	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Spic	Mer	W	Own	D	10.2	49.6	Ros	36x5	40x6 1/2	Day	...	8750	186 70			
Own	5750	Mack AC...	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	3	Spic	Mer	W	Own	D	10	33.7	Ros	36x6	40x12	Sch	...	8672	Op 73			
Own	6000	Mack AC...	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	3	Spic	Mer	W	Own	D	10	33.7	Ros	36x7	40x7 1/2	Sch	...	9050	Op 73			
Old Reliable K, L, M...	6250	Wau P...	4 3/4 x 6 1/4	36.1	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Wau	War	W	Own	D	11	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Royal 6...	...	W. RBU	4 3/4 x 6 1/4	36.1	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Mon	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78				
Royal 7...	...	W. RBU	5 1/2 x 7	44.1	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	6	Op	Op	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Sterling 7 1/2-Chain...	...	W. RBU	5 1/2 x 7	44.1	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	6	Op	Op	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Ster EU...	3450	Cont B2	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	6	Op	Op	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Tiffin 6...	5000	Reav JB	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Wau	War	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Wichita 8...	5000	Reav JB	4 1/2 x 6	32.4	H	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Wau	War	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Winther 140...	5900	Wis-RBU	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
<b>Gasoline Tractor-Trucks</b>																																				
Columbia GT...	2850	Hink HAA	4 1/2 x 5 1/2	25.6	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Federal Light Duty...	3325	Cont C4	4 1/2 x 5 1/2	27.2	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Federal Heavy Duty...	4300	Cont E4	4 1/2 x 5 1/2	32.4	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Garford 70H...	...	Buda HTU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Garford 77C...	...	W. RBU	4 1/2 x 5 1/2	36.1	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Garford 68...	...	W. RBU	4 1/2 x 5 1/2	36.1	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Hewitt-Ludlow 6-Ton...	1350	Buda HTU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Hood...	...	Buda HTU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Jumbo C...	3450	Buda HTU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Knock 35...	6000	Own 35	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Knex 36-3-Ton...	6500	Own 35	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Koehler MT...	3450	Her CU3	4 1/2 x 5 1/2	25.6	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Kuhn...	...	W. RBU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Lombard...	...	Spec 6	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Mack AB 5-Ton...	3400	Own AB	4 1/2 x 5 1/2	25.6	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Mack AC 7-Ton...	4950	Own AC	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Mack AC 10-Ton...	5500	Own AC	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Mack AC 13-Ton...	5750	Own AC	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Mack AC 15-Ton...	6000	Own AC	5 x 6	40	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Master T...	3740	Buda HU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Rennox 8-Ton...	...	W. RBU	4 1/2 x 5 1/2	28.9	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			
Watson...	...	Cont E4	4 1/2 x 5 1/2	32.4	L	C	Log	Fin	FS	Zen	G	Pier	Own	C	Eis	W	Covt	A	4	Dup	B.E.	W	Own	D	10	56.54	Ros	36x6	40x7 1/2	Sch	...	10240	136 78			

## Electric Commercial Cars

E. C. M.	Name and Model Number	Carrying Capacity	Chassis Weight	Chassis Price	Maximum Speed	Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Springs	Front Tires	Rear Tires	Steering Gear	Wheelbase	Pt. Cent of Weight on Rear Wheels
	Ward WS.....	750	1400	1900	12	Edis	45	G-E	Own	4	W	Shel	Shel	32x2½	32x3	Own	88	60
	C-T 14.....	1000	1800	1900	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	36x3	36x3½	W	89¼	60
	Walker M.....	1000	2300	2700	15	Opt	60	West	West	4	O	Timk	Math	34x3	36x3½	Ros	93	66
	Atlantic 1C.....	2000	2770	2700	12	Opt	60	G-E	G-E	4	O	Timk	S-El	34x4	36x4	Ros	103	65
	Ward WA.....	2000	2750	2300	12	Edis	47	G-E	G-E	4	W	Shel	Shel	32x3	34x3½	Own	90	60
	C-T 1.....	2000	2500	2300	14	Opt	60	G-E	Own	4	C-T	Flot	Shel	32x3½	36x4	W	101	60
	Steinmetz.....	2000	2700	2700	16	Exide	60	Own	West	4	B	Own	Math	32x4*	32x4*	Ros	Opt	66
	Walker K.....	2000	3430	2700	14	Opt	60	West	West	4	W	Shel	Math	34x3½	36x4	Own	96	66
	Ward WB.....	2000	3590	2700	10	Opt	43	G-E	G-E	4	W	Shel	S-El	34x3½	36x4	Own	102	60
	Atlantic 2C.....	4000	3500	2700	11	Opt	60	G-E	G-E	4	C-T	Timk	S-El	34x4	36x3½	Ros	115	65
	C-T 2.....	4000	3500	2700	12	Opt	60	Own	Own	4	C-T	Flot	Shel	36x4	36x4	W	116	60
	Walker L.....	4000	3800	2700	13	Opt	60	West	West	4	O	Own	Math	38x4	38x6	Ros	112	66
	Ward WD.....	4000	4500	2700	8.5	Edis	35	G-E	G-E	4	W	Timk	Shel	36x4	36x7	Own	114	60
	Atlantic 3C.....	7000	5220	3900	10	Opt	50	G-E	G-E	4	C	Dead	Shel	36x5	40x5½	Ros	135	65
	C-T 3½.....	7000	5000	3900	17	Opt	50	G-E	Own	4	W	Shel	Shel	36x5½	36x7	W	122	55
	Ward WF.....	7000	6600	3900	7	Edis	30	G-E	G-E	4	W	Dead	Shel	36x6	36x7	Own	132	60
	Atlantic 5C.....	10000	9250	3900	7	Edis	30	G-E	G-E	4	W	Timk	Shel	36x6	36x7	Ros	132	60
	Couple Gear H.....	10000	9250	3900	10	Phil	30	Own	Own	4	B	Own	Tut	36x5	36x5	Own	132	60
	Couple Gear.....	10000	10000	3900	7	Phil	30	Own	Own	4	B	Own	Tut	36x5½	36x5½	Own	132	60
	C-T 3.....	10000	10000	4400	10	Phil	30	Own	Own	4	B	Own	Tut	36x5½	36x5½	Own	132	60
	C-T 4.....	10000	6000	4400	10	Opt	50	G-E	Own	4	I	Dead	Shel	36x7	36x5	W	132	55
	Walker P.....	7000	5600	4400	11	Opt	50	West	West	4	O	Own	Math	36x5	38x5½	Ros	131	66
	Walker N.....	10000	6400	4400	7	Opt	50	West	West	4	O	Own	Math	36x6	38x6	Ros	141	66
	Ward WH.....	8375	6400	4400	10	Opt	50	West	West	4	O	Shel	Math	36x6	38x6	Ros	141	66
	Atlantic 6C.....	13000	8375	4400	6	Edis	26	G-E	G-E	4	W	Shel	Shel	36x6	38x6	Ros	141	66
	Couple Gear.....	14000	10000	4400	10	Phil	30	G-E	Own	4	B	Own	Tut	36x5	36x5	Own	141	66



## Manufacturers Whose Models Are Included in Specifications on Preceding Pages

- Acason—Acason Motor Truck Co., Detroit, Mich.  
 Ace—American Motor Truck Co., Newark, Ohio.  
 Acme—Acme Motor Truck Co., Cadillac, Mich.  
 Aetna—Aetna Motors Corp. of N. Y., New York, N. Y.  
 All-American—All-American Truck Co., Chicago, Ill.  
 All-Power—All-Power Truck Co., Detroit, Mich.  
 American—American Motor Truck & Tractor Co., New York, N. Y.  
 Apex—Hamilton Motor Co., Grand Haven, Mich.  
 Armleder—O. Armleder Co., Cincinnati, Ohio.  
 Atco—American Truck & Trailer Corp., Kankakee, Ill.  
 Atlantic—Atlantic Electric Vehicle Co., Newark, N. J.  
 Atlas—Atlas Truck Corp., York, Pa.  
 Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.  
 Autocar—Autocar Co., Ardmore, Pa.  
 Available—Available Truck Co., Chicago, Ill.  
 Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.  
 Bell—Iowa Motor Truck Co., Ottumwa, Ia.  
 Belmont—Belmont Motors Corp., Lewistown, Pa.  
 Bessemer—Bessemer Motor Truck Co., Grove City, Pa.  
 Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.  
 Betz—Betz Motor Truck Co., Hammond, Ind.  
 Birch—Birch Motor Cars, Chicago, Ill.  
 Brinton—Brinton Motor Truck Co., Philadelphia, Pa.  
 Brockway—Brockway Motor Truck Co., Cortland, N. Y.  
 C. T.—Commercial Truck Co., Philadelphia, Pa.  
 Capitol—Capitol Motors Corp., Fall River, Mass.  
 Champion—Champion Motors Corp., Philadelphia, Pa.  
 Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.  
 Chicago—Chicago Motor Truck, Inc., Chicago, Ill.  
 Clydesdale—Clydesdale Motor Truck Co., Clyde, Ohio.  
 Collier—Collier Motor Truck Co., Bellevue, Ohio.  
 Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.  
 Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.  
 Commerce—Commerce Motor Car Co., Detroit, Mich.  
 Concord—Abbot-Downing Truck & Body Co., Concord, N. H.  
 Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.  
 Cook—Cook Motors Corp., Kankakee, Ill.  
 Corbitt—Corbitt Motor Truck Co., Henderson, N. C.  
 Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.  
 Dart—Dart Truck & Tractor Corp., Waterloo, Ia.  
 Day-Elder—Day-Elder Motors Corp., Newark, N. J.  
 Dearborn—Dearborn Truck Co., Chicago, Ill.  
 Defiance—Defiance Motor Truck Co., Defiance, Ohio.  
 DeKalb—DeKalb Wagon Co., DeKalb, Ill.  
 Denby—Denby Motor Truck Co., Detroit, Mich.  
 Dependable—Dependable Truck & Tractor Co., Galesburg, Ill.  
 Diamond T—Diamond T Motor Car Co., Chicago, Ill.  
 Diehl—Diehl Motor Truck Works, Philadelphia, Pa.  
 Doane—Doane Motor Truck Co., San Francisco, Cal.  
 Dodge—Dodge Bros., Detroit, Mich.  
 Dorris—Dorris Motor Car Co., St. Louis, Mo.  
 Double Drive—Double Drive Truck Co., Chicago, Ill.  
 Douglas—Douglas Motors Corp., Omaha, Nebr.  
 Duplex—Duplex Truck Co., Lansing, Mich.  
 Duryea—Duryea Motors, Inc., Philadelphia, Pa.  
 Duty—Duty Motor Co., Greenville, Ill.  
 Eagle—Eagle Motor Truck Corp., St. Louis, Mo.  
 Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.  
 Elmira—Elmira Commercial Motor Car Co., Inc., Owego, N. Y.  
 Erie—Erie Motor Truck Mfg. Co., Erie, Pa.  
 F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.  
 Fageol—Fageol Motors Co., Oakland, Cal.  
 Famous—Famous Trucks, Inc., St. Joseph, Mich.  
 Fargo—Fargo Motor Truck Co., Chicago, Ill.  
 Federal—Federal Motor Truck Co., Detroit, Mich.  
 Ford—Ford Motor Co., Highland Park, Mich.  
 Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.  
 Front Drive—Double Drive Truck Co., Chicago, Ill.  
 Fulton—Fulton Motors Corp., New York, N. Y.  
 G. M. C.—General Motors Truck Co., Pontiac, Mich.  
 Garford—Garford Motor Truck Co., Lima, Ohio.  
 Gary—Gary Motor Truck Co., Gary, Ind.  
 Gersix—Gersix Mfg. Co., Seattle, Wash.  
 Giant—Giant Truck Corp., Chicago Heights, Ill.  
 Graham—Graham Brothers, Evansville, Ind.  
 Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.  
 Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.  
 Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.  
 Hal-Fur—Hal-Fur Motor Truck Co., Cleveland, Ohio.  
 Hall-Lewis—Hall Motors Corp., Detroit, Mich.  
 Harvey—Harvey Motor Truck Co., Harvey, Ill.  
 Hawkeye—Hawkeye Truck Co., Sioux City, Ia.  
 Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.  
 Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.  
 Highway—Knight—Highway Motors Co., Chicago, Ill.  
 Higrade—Higrade Motors Co., Harbor Springs, Mich.  
 H & M—H & M Motor Truck Co., Inc., Baltimore, Md.  
 Hood—Hood Mfg. Co., Seattle, Wash.  
 Hoover—Hoover Wagon Co., York, Pa.  
 H. R. L.—H. R. L. Motor Co., Seattle, Wash.  
 Huffman—Huffman Bros. Co., Elkhart, Ind.  
 Hurlburt—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.  
 Independent—Independent Motor Co., Youngstown, O.  
 Independent—Independent Motor Truck Co., Inc., Davenport, Ia.  
 Indiana—Indiana Truck Corp., Marion, Ind.  
 International—International Harvester Co., Chicago, Ill.  
 Jackson—Jackson Motors Corp., Jackson, Mich.  
 Jumbo—Nelson Motor Truck Co., Saginaw, Mich.  
 Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.  
 Kankakee—Kankakee Automobile Co., Kankakee, Ill.  
 Karavan—Caravan Motors Co., Portland, Ore.  
 Kearns—Kearns-Duglie Motors Co., Beavertown, Pa.  
 Keldon—House Cold Tire Setter Co., St. Louis, Mo.  
 Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.  
 Keystone—Keystone Motor Truck Corp., Philadelphia, Pa.  
 Kimball—Kimball Motor Truck Co., Los Angeles, Cal.  
 King Zeitler—King Zeitler Co., Chicago, Ill.  
 Kissel—Kissel Motor Car Co., Hartford, Cal.  
 Kleiber—Kleiber & Co., Inc., San Francisco, Cal.  
 Knox—Knox Motors Co., Springfield, Mass.  
 Koehler—H. J. Koehler Motors Corp., Bloomfield, N. J.  
 Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.  
 Lange—Lange Motor Truck Co., Pittsburgh, Pa.  
 Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.  
 L. M. C.—Louisiana Motor Car Co., Shreveport, La.  
 Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.  
 Lone Star—Lone Star Truck & Tractor Assn., San Antonio, Texas.  
 Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.  
 Luverne—Luverne Automobile Co., Luverne, Minn.  
 Maccar—Maccar Truck Co., Scranton, Pa.  
 MacDonald—MacDonald Truck & Tractor Co., San Francisco, Cal.  
 Mack—International Motor Co., New York, N. Y.  
 Marshall—Marshall Mfg. Co., Chicago, Ill.  
 Master—Master Trucks, Inc., Chicago, Ill.  
 Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.  
 Menominee—Menominee Motor Truck Co., Menominee, Mich.  
 Moreland—Moreland Motor Truck Co., Los Angeles, Cal.  
 Muskegon—Muskegon Engine Co., Muskegon, Mich.  
 Mutual—Mutual Truck Co., Sullivan, Ind.  
 Napoleon—Napoleon Motors Co., Traverse City, Mich.  
 Nash—Nash Motors Co., Kenosha, Wis.  
 Nelson-LeMoon—Nelson & LeMoon, Chicago, Ill.  
 Netco—New England Truck Co., Fitchburg, Mass.  
 Niles—Niles Motor Truck Co., Pittsburgh, Pa.  
 Noble—Noble Motor Truck Co., Kendallville, Ind.  
 Northway—Northway Motors Co., Natick, Mass.  
 Northwestern—Starr Carriage Co., Seattle, Wash.  
 Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.  
 O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.  
 Ogden—Ogden Motor & Supply Co., Chicago, Ill.  
 Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.  
 Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.  
 Oldsmobile—Olds Motor Works, Lansing, Mich.  
 Onelda—Onelda Motor Truck Co., Green Bay, Wis.  
 Orleans—New Orleans Motor Truck Mfg. Co., New Orleans, La.  
 Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.  
 Packard—Packard Motor Car Co., Detroit, Mich.  
 Paige—Paige-Detroit Motor Car Co., Detroit, Mich.  
 Parker—Parker Motor Truck Co., Milwaukee, Wis.  
 Patriot—Patriot Motors Co., Lincoln, Neb.  
 Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.  
 Pioneer—Pioneer Truck Co., Chicago, Ill.  
 Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.  
 Pony—Minnesota Machinery & Foundry Co., Minneapolis, Minn.  
 Power—Power Truck & Tractor Co., Detroit, Mich.  
 Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.  
 Reliance—Reliance Motor Truck Co., Appleton, Wis.  
 Rennoc—Rennoc-Leslie Motor Co., Philadelphia, Pa.  
 Reo—Reo Motor Car Co., Lansing, Mich.  
 Republic—Republic Motor Truck Co., Inc., Alma, Mich.  
 Reynolds—Reynolds Motor Truck Co., Mt. Clemens, Mich.  
 Riker—Locomobile Co. of America, Bridgeport, Conn.  
 Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.  
 Royal—Royal Motor Truck of N. Y., New York, N. Y.  
 Sandow—Sandow Motor Truck Co., Chicago, Ill.  
 Sanford—Sanford Motor Truck Co., Syracuse, N. Y.  
 Schacht—G. A. Schacht Motor Truck Co., Cincinnati, O.  
 Schwartz—Schwartz Motor Truck Co., Reading, Pa.  
 Selden—Selden Truck Corp., Rochester, N. Y.  
 Seneca—Seneca Motor Car Co., Fostoria, O.  
 Service—Service Motor Truck Co., Wabash, Ind.  
 Shaw—Walden W. Shaw Livery Co., Chicago, Ill.  
 Signal—Signal Motor Truck Co., Detroit, Mich.  
 Southern—Southern Truck & Car Corp., Greenboro, N. C.  
 Standard—Standard Motor Truck Co., Detroit, Mich.  
 Steinmetz—Steinmetz Electric Motor Car Corp., Baltimore, Md.  
 Sterling—Sterling Motor Truck Co., Milwaukee, Wis.  
 Stewart—Stewart Motor Corp., Buffalo, N. Y.  
 Stoughton—Stoughton Wagon Co., Stoughton, Wis.  
 Success—Webberville Truck Co., Webberville, Mich.  
 Sullivan—Sullivan Motor Truck Co., Atlanta, Ga.  
 Superior—Superior Motor Truck Co., Atlanta, Ga.  
 Texan—Texas Motor Car Asso., Fort Worth, Texas.  
 Tiffin—Tiffin Wagon Co., Tiffin, Ohio.  
 Titan—Titan Truck Co., Milwaukee, Wis.  
 Tower—Tower Motor Truck Co., Greenville, Mich.  
 Traffic—Traffic Motor Truck Corp., St. Louis, Mo.  
 Transport—Transport Truck Co., Mt. Pleasant, Mich.  
 Traylor—Traylor Eng. & Mfg. Co., Cornwells, Pa.  
 Triangle—Triangle Motor Truck Co., St. Johns, Mich.  
 Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.  
 Twin City F. W. D.—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.  
 Twin City—Minneapolis Steel & Mach. Co., Minneapolis, Minn.  
 Ultimate—Vreeland Motor Co., Inc., Newark, N. J.  
 Union—Union Motor Truck Co., Bay City, Mich.  
 United—United Motors Co., Grand Rapids, Mich.  
 U. S.—United States Motor Truck Co., Cincinnati, Ohio.  
 Velle—Velle Motors Corp., Moline, Ill.  
 Victor—Victor Motor Truck & Trailer Co., Chicago, Ill.  
 Vim—Vim Motor Truck Co., Philadelphia, Pa.  
 Walker—Walker Vehicle Co., Chicago, Ill.  
 Walker-Johnson—Walker-Johnson Truck Co., Woburn, Mass.  
 Walter—Walter Motor Truck Co., New York, N. Y.  
 Ward—Ward Motor Vehicle Co., Mt. Vernon, N. Y.  
 Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.  
 Ware—Ware Twin Engine Truck Co., Minneapolis, Minn.  
 Watson—Watson Wagon Co., Canastota, N. Y.  
 Wells—Evans Truck & Axle Co., Auburn, Ind.  
 White—White Co., Cleveland, Ohio.  
 White Hickory—White Hickory Motor Corp., Atlanta, Ga.  
 Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.  
 Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.  
 Wilson—J. C. Wilson Co., Detroit, Mich.  
 Winther—Winther Motor Truck Co., Kenosha, Wis.  
 Witt-Will—Witt-Will Co., Inc., Washington, D. C.  
 Wolverine—American Commercial Car Co., Detroit, Mich.

## Price List, Maximum Capacities and Inflation Pressures of Large Size Pneumatic Tire Casings

	36 x 6			38 x 7			40 x 8			42 x 9			44 x 10		
	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure
American Rubber & Tire Co., Akron, O.															
Americord, non-skid	117.75	.....	...	166.00	.....	...	213.85	.....	...	.....	.....	...	.....	.....	...
Bergougnan Rubber Corp., Trenton, N. J.															
Bergougnan Cord, non-skid	141.10	2000	90	184.55	2700	100	239.10	3650	110	.....	.....	...	.....	.....	...
Braender Rubber & Tire Co., Rutherford, N. J.															
Braender Super Cord, non-skid	132.50	2200	90	187.35	3000	100	241.40	4000	110	.....	.....	...	.....	.....	...
Brunswick-Balke-Collander Co., Chicago, Ill.															
Brunswick Cord, Skid-Not	128.90	.....	90	182.30	.....	100	234.85	.....	110	.....	.....	...	.....	.....	...
Curtis Tire & Rubber Co., Muskegon, Mich.															
Curtis Cord, Road	119.35	2200	90	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...
Empire Tire & Rubber Co., Trenton, N. J.															
Empire Cord, non-skid	119.35	2000	90	168.80	2700	100	217.45	3650	110	.....	.....	...	.....	.....	...
Falls Rubber Co., Cuyahoga Falls, O.															
Falls Cord, Neverslip	140.00	2200	90	180.00	3000	100	230.00	4000	110	.....	.....	...	.....	.....	...
Federal Rubber Co. of Ill., Cudahy, Wis.															
Federal Cord, non-skid	119.35	2300	90	168.80	3000	100	217.45	4000	110	.....	.....	...	.....	.....	...
Firestone Tire & Rubber Co., Akron, O.															
Firestone Cord, non-skid	119.35	2200	90	168.80	3000	100	217.45	4000	110	272.35	5000	120	380.65	6000	130
Fisk Rubber Co., Chicopee Falls, Mass.															
Fisk Cord, non-skid	119.35	2200	90	168.80	3000	100	217.45	4000	110	272.35	5000	120	380.65	6000	130
General Tire & Rubber Co., Akron, O.															
General Cord, non-skid	130.85	2200	90	185.15	3000	100	238.50	4000	110	298.65	5000	120	417.45	6000	130
Goodrich, B. F. Rubber Co., Akron, O.															
Goodrich Cord, Ribbed	119.35	2200	90	168.80	3000	100	217.45	4000	110	.....	.....	...	.....	.....	...
Goodrich Cord, Safety	119.35	2200	90	168.80	3000	100	217.45	4000	110	.....	.....	...	.....	.....	...
Goodyear Tire & Rubber Co., Akron, O.															
Goodyear Cord, Ribbed	119.35	2200	100	168.80	3000	110	217.45	4000	120	.....	.....	...	.....	.....	...
Goodyear Cord, All-Weather	119.35	2200	100	168.80	3000	110	217.45	4000	120	272.35	5000	130	380.65	6000	140
Hewitt Rubber Co., Buffalo, N. Y.															
Hewitt Cord, non-skid	132.60	2000	90	187.50	2850	100	.....	.....	...	.....	.....	...	.....	.....	...
Howe Rubber Co., Inc., New Brunswick, N. J.															
Howe Ultra Cord, non-skid	127.25	2000	90	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...
India Tire & Rubber Co., Akron, O.															
India Cord, non-skid	143.20	2200	90	202.50	3000	100	295.00	4000	110	.....	.....	...	.....	.....	...
International India Rubber Corp., South Bend, Ind.															
Odell Cord, rough	119.35	2000	90	168.80	2700	100	.....	.....	...	.....	.....	...	.....	.....	...
Lee Tire & Rubber Co., Inc., New York, N. Y.															
Lee puncture-proof, non-skid	143.25	1970	90	202.75	2720	100	260.95	3595	110	.....	.....	...	.....	.....	...
Kelly-Springfield Tire Co., Cleveland, O.															
Kelly-Springfield Cord, grooved	140.00	2000	90	188.00	27.00	100	236.00	3500	110	.....	.....	...	.....	.....	...
Kelly-Springfield Cord, BB	140.00	2000	90	188.00	2700	100	236.00	3500	110	.....	.....	...	.....	.....	...
McGraw Tire & Rubber Co., Cleveland, O.															
McGraw Cord, ribbed	131.25	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...
McGraw Cord, non-skid	131.25	.....	...	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...
Marathon Tire & Rubber Co., Cuyahoga Falls, O.															
Marathon Cord, Angle	120.00	2200	100	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...
Mason Tire & Rubber Co., Kent, O.															
Mason Cord, non-skid	119.35	2200	90	166.10	3000	100	216.40	3750	100	.....	.....	...	.....	.....	...
Miller Rubber Co., Akron, O.															
Miller Cord, Geared-to-the-Road	125.65	2200	90	177.65	3000	100	228.90	4000	110	.....	.....	...	.....	.....	...
Mohawk Rubber Co., Akron, O.															
Mohawk Cord, non-skid	136.00	2200	90	190.00	3000	100	240.00	4000	110	.....	.....	...	.....	.....	...
Norwalk Tire & Rubber Co., Norwalk, Conn.															
Norwalk Cord, non-skid	125.20	2000	90	.....	.....	...	.....	.....	...	.....	.....	...	.....	.....	...
Oldfield Tire Co., Cleveland, O.															
Oldfield Cord, anti-skid	125.30	2200	90	177.25	3000	100	228.30	3725	100	.....	.....	...	.....	.....	...
Owen Tire & Rubber Co., Bedford, O.															
Owen Heavy Duty	131.35	2200	96	185.70	3000	112	239.20	4000	128	.....	.....	...	.....	.....	...
Pennsylvania Rubber Co., Jeannette, Pa.															
Vacuum Cup Cord	108.40	2200	90	153.35	3000	100	197.60	4000	110	.....	.....	...	.....	.....	...
Perfection Tire & Rubber Co., Fort Madison, Ia.															
Perfection Cord, non-skid	119.35	2200	90	168.80	3000	100	217.40	4000	110	.....	.....	...	.....	.....	...
Racine Rubber Co., Racine, Wis.															
Racine Multi Mile Cord, non-skid	117.85	2200	90	166.65	3000	100	214.75	4000	110	.....	.....	...	.....	.....	...
Republic Rubber Co., Youngstown, O.															
Republic Grande Cord, Stagard Tread	129.00	2200	90	182.45	3000	100	235.05	4000	110	.....	.....	...	.....	.....	...
Standard Tire Co., Willoughby, O.															
Tiger Foot, non-skid	156.65	2200	90	210.85	3000	100	.....	.....	...	.....	.....	...	.....	.....	...
Stanwood Rubber Co., Inc., Elizabeth, N. J.															
Stanwood, non-skid	129.00	2200	90	183.00	2300	100	235.00	4000	110	.....	.....	...	.....	.....	...
Star Rubber Co., Akron, O.															
Star Cord, "All Star"	144.00	2200	90	192.00	3000	100	240.00	4000	110	.....	.....	...	.....	.....	...
Swinehart Tire & Rubber Co., Akron, O.															
Swinehart Cord, Hexagon	119.35	2000	90	168.80	3000	100	.....	.....	...	.....	.....	...	.....	.....	...
United States Tire Co., New York City.															
U. S. Nobby Cord	119.35	2200	90	168.80	3000	100	217.45	4000	110	272.35	5000	120	380.65	6000	130

### Baseball Encouraged and Fostered by Rome-Turney Company

Five rattling fast baseball teams that could hold their own with any state league team comprise the Industrial League of Rome, N. Y., and the thousands of employees of the several big industrial plants of the city may well be classed as enthusiastic fans.

One of the best teams of the league is that of the Rome-Turney Co., who play fast ball in the evening and during the day make radiators for trucks, tractors,

automobiles, aeroplanes, stationary engines, etc.

The pennant-winning team will be sent to the world's series for two games, and 12 men and the manager will have every expense paid. Second best team will have a week-end trip to the Coney Island Mardi Gras, the third team will be sent to the State Fair at Syracuse, N. Y., the fourth team will each be given a three month's ticket to a Rome theatre and the members of the fifth team will get a gold watch apiece. Games are played Monday and Thursday evenings, a game being played simultaneously on two fields, this being done to divide the crowds.

No admission is charged and eight thousand people have seen some of the games when the fight was at its height. The heads of the industrial plants maintain the ball parks and defray all expenses, which are high, but a good investment, and every advantage is given a prospective player or a regular player to perfect his game.

This is one of the most successful forms of entertainment ever devised by Rome manufacturers for their employees, and it is bringing good results. The men appreciate the plan, better work is done, and industrial peace is present in abundance.



# Effective System Employed by a Strictly Truck Garage Affords Complete Satisfaction to Owners

This Garage, Located in the Heart of Philadelphia's Wholesale District, Takes Care of Fleets and Individual Trucks With Equal Facility

By K. HERRICK

**M**AINTAINING a commercial garage—a garage primarily for motor trucks—means the stressing of service, even more than in the case of a garage catering expressly to passenger cars. The harder and more continuous the use of a vehicle, the more important it is to care for all its needs promptly and efficiently.

There are certain differences in service and the manner of applying it, between the commercial garage and the garage, all of whose customers are owners of automobiles. In the latter case, few customers store more than one or two passenger cars in a garage; but frequently fleets of many units are housed in the commercial garage, in addition to small fleets and numerous individual trucks. It is not always an easy matter to please the owner of a large, or a middle-sized fleet as regards the care given to each and every one of his trucks, while it is comparatively easy to please the owner who has only one automobile, or perhaps two. This means that pains must be taken repeatedly and in many instances to satisfy a single customer who stores his trucks with a garage owner.

To conduct a commercial garage means, at the outset, to have plenty of space, not only for present accommodations, but to be prepared for large future acquisitions—taking on the care of an extra fleet often means the sudden necessity for much room.

In the matter of location for the building, the wise garage operator always aims for a strategic position in the heart of a locality where truck traffic is heavy; for in-

## This Garage:

Harbors large and small fleets of trucks and individual commercial cars.

Services them under an advantageous arrangement with a truck dealer who leases a portion of the large building.

Sells truck accessories, but carries little stock.

Sells gasoline on a card system, each card being issued for 106 gallons and sold in advance.

Has large contracts with three big oil companies and gives customers the benefit of special rates.

Maintains an original washing system.

Has originated a notable system of keeping close track of space used and available for sale, through the use of a "Garage Layout Chart."

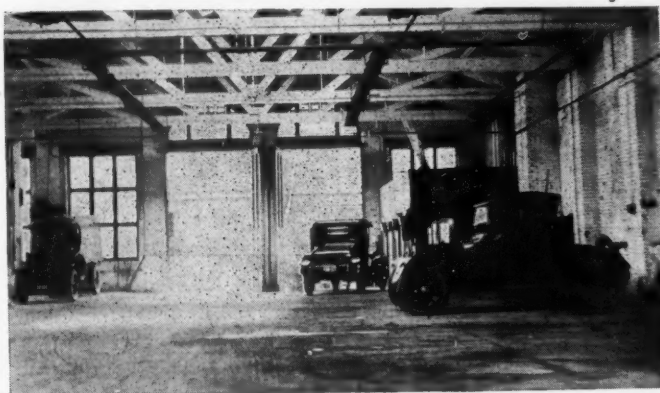
stance, the wholesale district, for position means almost as much to the garage as to the cigar store. If the garage owner is a late arrival in a city, or town, it may not be possible to get right in the heart of the desirable district at once, but it is well to get as near as possible to the center of the traffic.

Fleet owners never fail to appreciate an arrangement with a garage whereby their own drivers, who usually are mechanics at least after a fashion, can have certain hours of the day, and, if possible, certain space in the garage, to make minor repairs and adjustments on their trucks.

The commercial garage owner who fights this plan on the ground that the garage is giving service and hires mechanics to do it and that therefore the customer should not be allowed to "interfere," is taking as absurd a stand as the barber who refuses to sharpen safety razors because they're "cutting his business."

The commercial garage owner has an advantage over the passenger car garageman in the matter of washing and uninterrupted night work in general. When a commercial car is in for the night, it is in "for keeps." An automobile owner—in fact, many of them at about the same time, or in an annoying sequence, may take a car out and bring it back several times after it has apparently been parked till morning, or it may be taken out at any unreasonable hour after midnight.

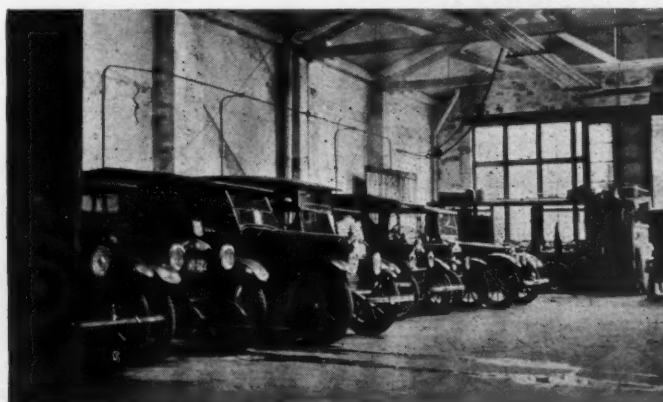
Trucks, too, can be, and usually are, given thorough inspection both when off duty and on the road, where the



**View in the Service Station at the Rear of Double Building**  
Here are seen both trucks and passenger cars, the latter being stored as an accommodation. Note the small tool shop at extreme rear



**The Larger Trucks Are Stored Along the Side-Walls**  
They face the central space, allowing them to move out from position through the aisles, which are kept clear



**An Overhead Heating System is a Convenience in a Garage**  
It keeps the pipes out of the way and permits closer storage along the walls than where piping and coils take up space



The Northern Liberties Garage Has One Hundred Feet of Frontage in an Advantageous Locality in the Wholesale District

garageman has the service facilities. Of course, service in the case of trucks, must be especially prompt and thorough, so that work may be continued by the car owner

This means that high grade mechanics must be at hand in the garage. There is a tendency among some garage owners at present to lease a portion of their space, where the building is sufficiently large, to a truck dealer as a service station, making an arrangement whereby the dealer's mechanics are available for the general garage service.

Sometimes, too, the commercial garageman, because of his ability to command a considerable discount on truck accessories, tires, oil and gasoline can procure these supplies for his customers at reduced rates. This often has the effect of welding, so to speak, the client's custom to that particular garage.

Often the commercial garageman can handle tires and accessories for trucks as a special department of his business, possibly affording a small window display, or interior show cases as a means of calling attention to it.

What kind of storage the commercial garageman is to give—live, semi-live, or dead, or a combination thereof, is largely an individual matter; but few if any commercial garagemen will handle trucks on a dead storage basis.

A commercial garage in Philadelphia, which operates under a number of the foregoing favorable circumstances, is the Northern Liberties Garage, 522-532 North Third Street and 591-531 North Orianna Street. The proprietor is William M. Moser, who is experienced in conducting garages for both passenger cars and trucks.

#### Two-Entrance Arrangement

The double address of the garage means that the building runs through from one important thoroughfare to another—an excellent arrangement in a thickly populated wholesale traffic center. The building, which has but one story, a small mezzanine and a hanging office in the rear portion, reached by a long flight of stairs, is high enough for

two stories. It has 100 ft. of frontage on Third Street and is 108 ft. in depth to Orianna Street, where there is an en-



Arrangements for Washing Trucks in This Garage Have Been Carefully Planned

Hot and cold water are piped parallel throughout the building

trance almost as imposing as the large front entrance on Third.

The rear portion, used as a service station and repair department, as well as

for car storage, is 106 ft. wide and 70 ft. in depth. A tool shop, located at the left of the service station door, as one leaves by the rear exit, is partitioned off from the rest of the space by heavy wire and is 20 by 9 ft. There is space in the main part of the garage proper for more than fifty large trucks. Big pasteboard numbered tags, suspended at intervals over the wall aisles, show the various spaces allotted, each customer being assigned a number. Customers' keys are hung on numbered hooks in the office.

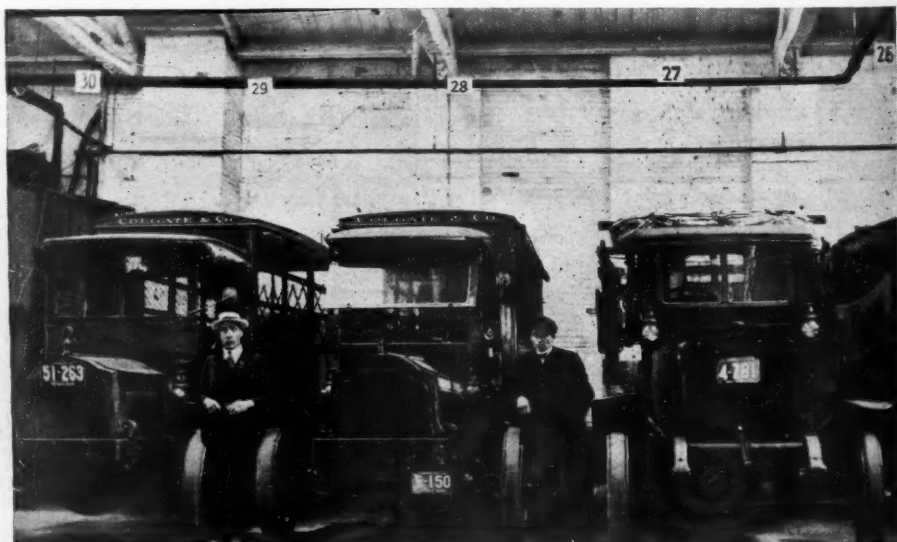
Mr. Moser has leased the service station portion, including the machine shop department and hanging office, to the Maccar Truck Co., under an advantageous arrangement whereby the Maccar Company will service the trucks stored with the Northern Liberties Garage Co.

The garage customers thus have the benefit of a large and highly skilled force of truck mechanics, always on hand and some of whom always are available for servicing for the garage company. The Maccar machine shop layout includes high-speed lathes, arbor presses, electric drills and all the devices that a thoroughly modern service station requires.

This will permit the garage company to concentrate its own labor on washing trucks and such minor duties, relieving the concern of the burden of employing mechanics and filling gaps in their ranks—a considerable item at this time in a garage business doing service.


#### Special Rates Extended to Customers

While only a small stock is kept on hand, the garage company sells truck accessories, obtaining them, of course, at a special rate, this enabling them to be sold to the customer at prices lower than they could be obtained by him at retail. The company holds large contracts with the Atlantic Refining, Texas and Gulf oil companies and also can give the customer the benefit of reductions on oil and grease. The oil stock is stored in large cans on the mezzanine, pipes attached thereto leading to spigots on the first floor, near the door of the main office, in front.



Big Pasteboard Tags, Suspended at Intervals Over the Wall Aisles, Designate the Space Allotted to Each Customer





**S**TUDY the construction of this Firestone Inside Blowout Patch. Built for double duty—holds the blowout securely and protects the inner tube. It is Firestone quality in materials, in construction, in accurate shape. Built up of six plies of rubberized fabric to give the greatest strength while preserving flexibility.

At both ends a molded-in real rubber tip, originated by Firestone, prevents the tube from coming in contact with the raw edges of the fabric.

Made wide enough to reach from bead to bead, curved to exactly conform to the inside dimensions of the case, fitting snugly without buckling.

There is a Firestone Tire Accessory for every emergency need. All are made to the well-known Firestone Standard—most miles per dollar. Order direct or through your jobber.

**Firestone Tire & Rubber Company**  
Firestone Park Akron, Ohio  
Branches and Dealers Everywhere

# Firestone

## BLOWOUT PATCH





# *The* Contented Driver

**E**ASY steering makes Contented Drivers. It conserves human strength and increases efficiency in both driver and truck. It means a bigger day's work more easily done and greater satisfaction to both the owner of the truck and the man who drives it.

This Contented Driver is only one of 200,000 who go to their homes after a better day's work with lighter hearts and with less wearied bodies, because the trucks they drive are equipped with

## ROSS STEERING GEARS

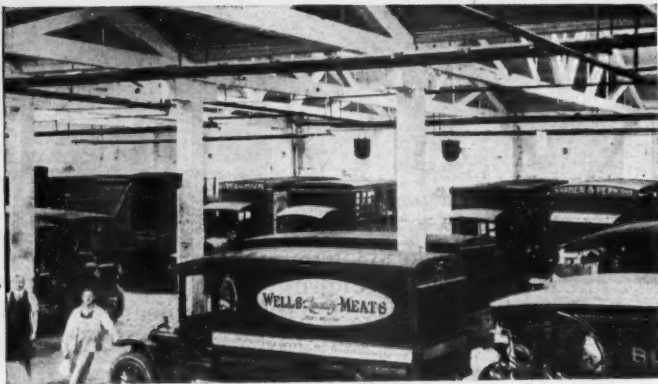
The special feature which distinguishes Ross Gears from all others is the screw and nut mechanism which transfers the action of the steering wheel to the steering arm. The nut is a solid piece, completely enveloping the screw, so that the enormous bearing surface on the threads of both screw and nut is utilized with every turn of the wheel.

These bearing surfaces not only make steering easy under all conditions, but they guarantee an unusual degree of safety and reliability.

Ross Steering Gears are now used as standard equipment by 171 different manufacturers, representing considerably over half the entire motor truck industry.

*Write for catalog and any other information desired about "The Steering Gears that Predominate on Motor Trucks."*

**ROSS GEAR & TOOL COMPANY, 760 Heath St., Lafayette, Ind.**



General View, Taken From the Mezzanine, of the Garage Main Floor as it is beginning to Fill for the Night.

Usually a certain day is allotted to a customer's truck when it cannot, for any reason, be washed on Saturday or Sunday. The washers' unsightly paraphernalia, rubber boots, hose and so on, are kept in lockers on the mezzanine.

#### Minor Repairs May be Made

Chauffeurs are permitted to make minor repairs on the trucks between 7 A. M. and 7 P. M., a place being assigned them. It is the rule, however, that they must provide their own tools and necessary paraphernalia, as tools will not be supplied, nor will it be permitted to borrow tools from other vehicles. Circular letters to customers and prospects, setting forth what the garage will do for them, are mailed from time to time.

The company keeps an index system of "Customers' Cards," filing them in a cabinet, under the customer's name, alphabetically. These cards, 8 by 5 in., are ruled and made into columns for the following data: Customer's name, address and telephone number; date of arrival, price (rate); number of each

truck; name of truck; length and width; extra washing and date out. Any remarks as to customer or trucks, that it may be advisable to keep on file, are entered on the back of the card.

#### Garage Layout Chart

The entry of width and length of truck is a most important one for this garage, which has an original method of keeping exact tab on its occupied and unoccupied space, to the inch. This is done by means of a "Garage Layout Chart." First, an accurate drawing, from blue prints of the building's interior, was made, showing dimensions, to scale, of the garage proper, the service station portion in the rear and the machine shop.

The scale, as drawn, is one-eighth of an inch to the foot. Tickets, or oblong slips, of red pasteboard, cut to scale, each representing a truck in storage, are placed on the drawing, and as fast as customers' trucks are added, slips are placed representing them. On each ticket are: The name of the customer, the make of the truck and its dimen-

sions. The slips are held in place on the drawing by a top of heavy transparent glass covering the chart.

It is desirable to enter on the slips the make of each truck, for reference in purchasing parts, when necessary, or for any other reason which may make it advisable to know how many trucks of different manufacture are in storage.

As fast as a customer removes his trucks permanently from storage, that is, closes his account—the corresponding slips are removed from the chart. This enables the proprietor to know at a glance exactly what trucks are stored, the space they take up, their position and how much and what space he has left to sell. It also enables any employee thus authorized, to tell, in the absence of the proprietor, just what space he can sell to a new customer. This saves times and permits a minimum of office force.

Keeping a chart of the trucks stored affords an opportunity, too, of finding out accurately in the course of a given period what makes of trucks require the most servicing and what types of trucks predominate in the neighborhood.

The smaller trucks are stored in the central spaces, parallel to the length of the building, with the larger trucks, for the most part, along the walls, facing the center.

This arrangement allows the larger trucks to move freely from their positions through the aisles, which are kept clear.

The chart is kept on a table in the garage office, where it is available at all times. It is considered by the proprietor as one of his most useful devices.

## Lincoln Highway Has 1190 Miles of Pavement

The Lincoln Highway extends from New York to San Francisco, and has 1190.1 miles of solid, paved or macadamized roadbed. The total distance is 3223 miles and 2031.9 of this is as follows: 801 miles graded dirt, 749 miles graded gravel, 207.2 miles natural gravel, 17 miles shale, 13.2 miles sand. Of the hard surface 406.3 is bituminous macadam, 317 concrete, 197.8 brick, 175 macadam, 80.6 asphalt, 7.8 granite block, creosoted wood block, 6.6. These figures held good March 1, 1920.

## Exports for May

Exports for May were 1301 commercial cars, worth \$2,147,577, and 13,620 passenger cars, valued at \$15,059,601.

Of commercial cars Belgium received 49, valued at \$85,848; Norway, 30, \$46,157; Sweden, 54, \$107,778; Canada, 151, \$259,176; Cuba, 119, \$217,597; Argentina, 57, \$109,554; Peru, 39, \$57,593; British India, 65, \$147,640; Philippine Islands, 122, \$116,870.



## Specially Designed Martin-Parry Outfit Makes Tour of the Country as an Advertising Medium

A special advertising truck, designed by the Martin-Parry Corp., Indianapolis, Ind., manufacturers of commercial bodies, is making a tour of the country, stopping at all the principal cities. The specially designed feature of this one-ton Ford truck which permits of rigidly fastened styles of bodies upon the platform for display purposes, has attracted considerable attention. This truck is scheduled to spend several weeks' time with each of the Martin-Parry branches at Boston, Buffalo and Chicago before proceeding westward to the coast.



SIVYER  CASTINGS

Among the makers who assure greater dependability and longer life of their products through the partial or exclusive use of Sivyer Electric Steel Castings are:

#### Tractors

J. I. Case T. M. Company  
Dart Truck & Tractor Corporation  
Electric Wheel Company  
General Ordnance Company  
Holt Manufacturing Company  
Huber Manufacturing Company  
Illinois Tractor Company  
International Harvester Company  
Keck Gonnerman Company  
John Lauson Manufacturing Company  
Minneapolis Threshing Machine Co.  
Peoria Tractor Corporation  
Port Huron Eng. & Threshing Co.  
Samson Tractor Company  
Turner Manufacturing Company  
H. A. Wetmore

#### Trucks and Automobiles

Dart Truck & Tractor Corporation  
Diamond "T" Motor Car Company  
Federal Motor Truck Company  
Forschler Motor Truck Mfg. Co.  
Menominee Motor Truck Company  
Mitchell Motors Company, Inc.  
Nash Motors Company  
National Motor Car and Vehicle Corp.  
Parker Motor Truck Company  
Reo Motor Car Company  
Service Motor Truck Company  
Sterling Motor Truck Company  
Velie Motors Corporation

#### Engine, Parts and Implement Manufacturers

B. F. Avery & Sons  
Deere & Company  
Falls Motor Company  
Foote Bros. Gear & Machinery Co.  
Grand Detour Plow Company  
Jaxon Steel Products Co.  
Midwest Engine Company  
R. D. Nuttall Company  
Wisconsin Motor Manufacturing Co.



*Rear Axle Housing used on the 5-ton Parker worm-drive Motor Trucks*

## Complicated—Yet Flawless

**T**HE thin metal sections and the heavy bosses of the casting shown above caused expensive losses when molded by ordinary methods. It was difficult to get the metal to run in the thin sections, so that many castings had a tendency to crack and draw. But Sivyer devised fitting methods of heading, gating, and of mixing and molding the core sand—and overcame all difficulties. It is the solution of problems such as those involved in this housing that has won for Sivyer Castings their nation-wide market.

# SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

# This Distributor Signs 'Em Up in His Traveling Office

By C. S. PERRIE

**W**HEN the Mohican Motor Corporation, of New York City, was formed to take over the distribution of the Napoleon line of trucks, made by the Napoleon Motors Company, Traverse City, Mich., C. W. Waughop, sales manager of the New York company, decided to depart from the conventional method of securing dealers.

The Mohican Motor Corporation is Eastern distributor for the Napoleon trucks, and Sales Manager Waughop's method is to travel from city to city in a Napoleon truck, thus giving his personal attention to lining up his dealers. In other words, he visits the prospect on his own grounds, to ascertain not only if the dealer can sell trucks, but if he is in a position to render service.

Therefore, Waughop hied himself to the Napoleon factory and had a special body constructed. Incidentally, while the body was being constructed he learned how Napoleon trucks were built. And when the job was completed, and after the factory officials had looked over the job, J. O. Peet, a factory man, took the wheel and the truck began its trip to New York. Waughop can drive but says Peet really likes driving.

The writer ran into the outfit in Detroit where a stop was made to complete the equipment. And when the job was done this is what the writer saw: A roomy, well-lighted body constructed of four-ply material, a completely enclosed job finished in a bright red. It was well-lettered, as shown by accompanying illustrations.

Entrance to the rear is by a folding type of ladder which can be stowed away without much loss of space, while the front entrance is conventional with the exception of the cab.

## Carries Office Equipment

The driver's compartment is separated

typewriter, etc. There is a rack or file over desk for storing catalogues, circulars and other printed matter, and there is a map board. And as the various towns and cities are visited the day's run is marked off.

There are four folding chairs, and when any are not in use they are placed next to the wall and between the studs. Padding ingeniously arranged, prevents movement of the chairs and rattling. Photographs of the Napoleon trucks are arranged around the frieze, and electric lights are conveniently located. An army type of trunk is surmounted by a leather cushion, and a second cushion forms a back, providing seats for two persons.

All of the windows are covered with Pullman-car type of screen, and ample ventilation to the cab is assured by two screened windows above the windshield. Two storage batteries are carried in a special compartment at the left of the driver's seat, and these are so wired that one switch controls the charging and current supply. The top moulding on the exterior of the body is illuminated at night by speedometer-type of electric lights, and the spot light can be removed and used as a trouble lamp. Ash trays, even for the driver, and electric cigar lighters are conveniently located. There is a clock for the driver as well as two types of rear vision mirrors. Two pneumatic mattresses are to be added.

The truck is equipped with Gabriel snubbers, Pyrene fire extinguishers, Firestone pneumatics, large; rear signalling



**Napoleon Truck With Body Fitted as Office**

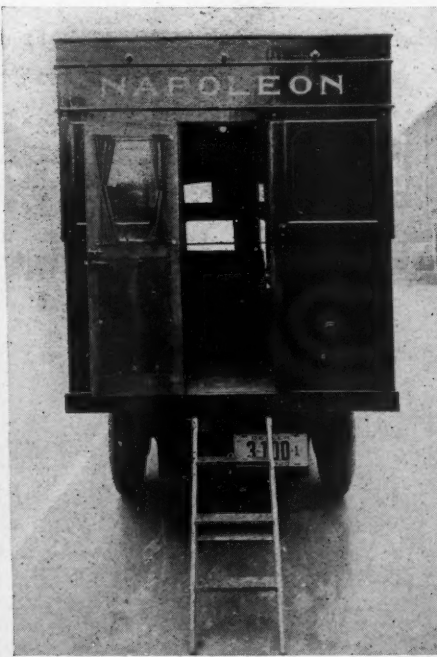
To be used by sales manager of distributor to secure dealers

from the main compartment by a panel sufficiently high to form the back of the driver's seat. There is a doorway on the left on entering the cab, and curtains sliding on rods permit of privacy when desired. The office is approximately 5½ x 9 feet. The height from floor to ceiling is 6 ft. 4 in. The interior is finished in oak and is well-lighted all around, there being two windows on either side, also a rear window, while the cab has extra large window space.

The office equipment includes a desk with swinging extension table, file cabinet,



**Driver's Compartment**

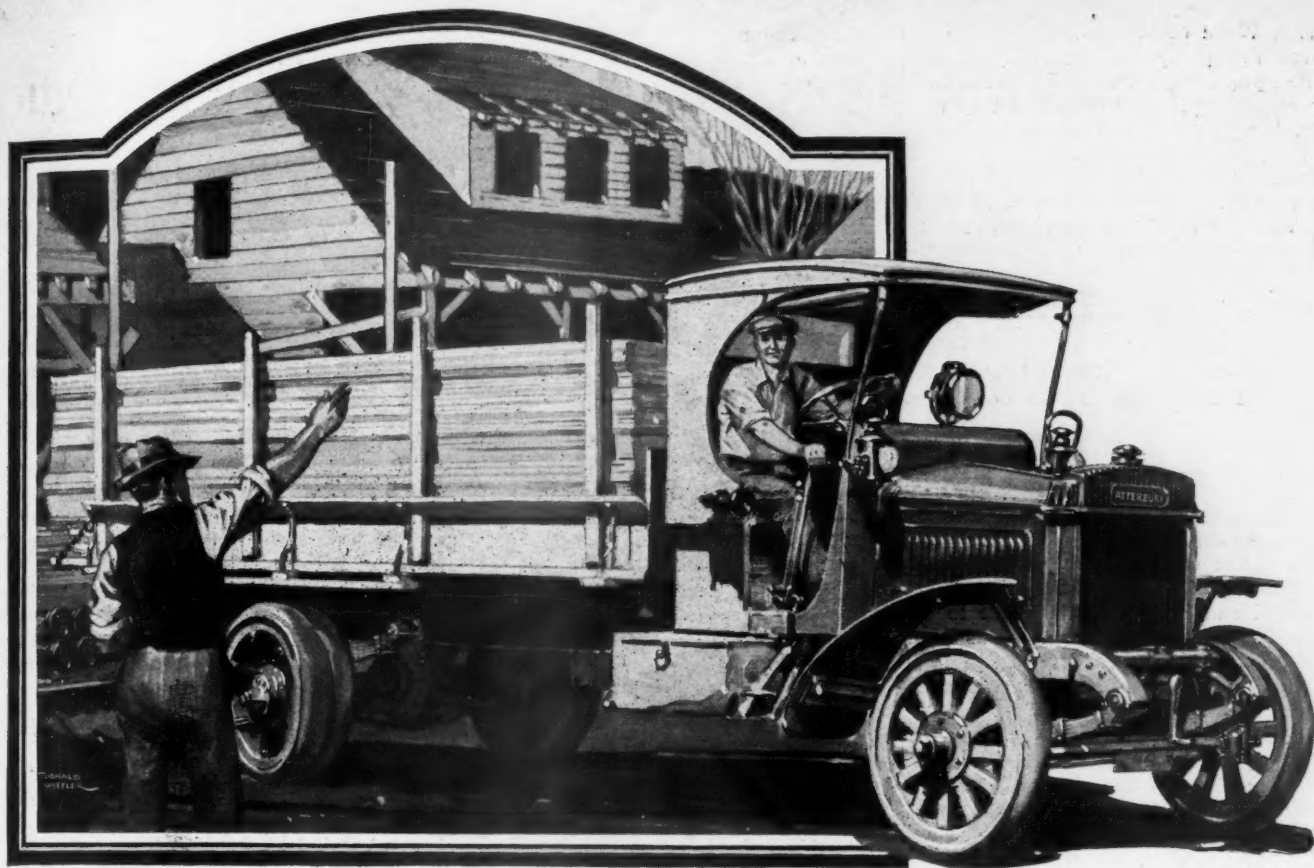


**Office Entrance at Rear**



**Part View of Interior**





## Is there one *best* truck?

IS there one motor truck that stands out from all the rest?

Is there one truck which gives better all-round service to owners—which stands up better—costs less to run than other trucks?

What is your opinion? Atterbury Dealers tell us emphatically that there *is* one best truck.

We at the factory do not claim that the Atterbury is the best truck.

But we know—with the knowledge born of 11 years experience that there is no better truck built to-day.

1½—2½—3½—5—Ton

Atterbury Motor Car Co. Buffalo, N. Y.



Eleven years of successful truck-making experience are built into every Atterbury Truck. This is the secret of Atterbury performance.

# ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

device, Weed tire chains, Kellogg power-driven tire pump. There are jacks and cable equipment as well as a trench shovel for emergency, a good tool kit and an extra supply of oil and gas in containers on the running board.

Before the truck pulled out of Detroit the writer was informed that there would be Vacuum bottles added, also an ice chest and other things. Inasmuch as the

other things were not explained much must be left to the imagination. And one guess is as good as another. Regardless of the point in question sales manager Waughop believes his traveling office will prove interesting to the prospective dealers and that he can accomplish more than by the conventional methods. Perhaps he contemplates enticing his prospect into his office and whirling him away, and to

keep whistling until the prospect "signs the papers." And if a prospect proves obstinate, wants time to think it over, Mr. Waughop can get out the "other things" and the mattresses. And having a tire pump, inflate them. And he can wait and wait without worrying about hotel bills, reservations, poor service, etc. In this respect he is to be envied.

## St. Louis Tour Runs Into Exceptionally Bad Roads

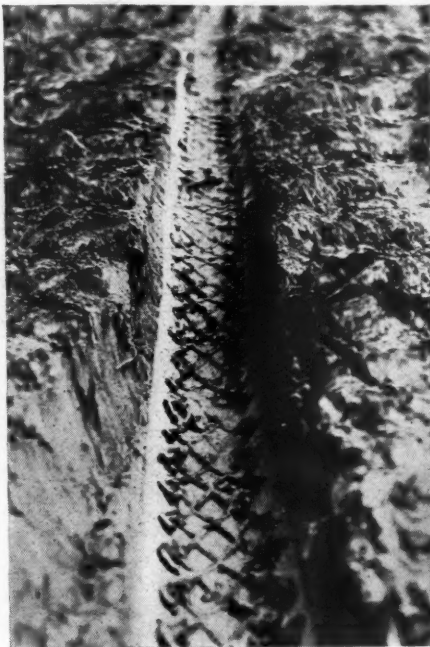
**B**ELIEVING that highway trucking over hard-surfaced roads is the logical solution of our present transportation problem, the St. Louis Automobile Manufacturers' and Dealers' Association recently sent 37 loaded trucks on a tour through southern Missouri and Illinois in an effort to develop favorable sentiment for this idea. Lecturers accompanied the caravan in automobiles and told of the benefits to be expected from highway trucking.

The roads over which the tour was run are not good under favorable conditions and, at the time of the start, they were in an almost impassable condition due to a steady downpour of rain for the preceding 24 hours. In fact, several of the faint-hearted predicted that no truck would be able to make such a trip. However, the start was made according to schedule and for ten days the company proceeded laboriously through an almost constant succession of mudholes, flooded bottoms, creeks that had to be forded and practically every other kind of an obstacle to an undertaking of this nature.

The route lay along the Mississippi from St. Louis to Cape Girardeau, Mo., and up the other side of the river from McClure, Ill., through Anna, Murphysboro, Du Quoin and Belleville, back to the starting point.

Only pictures can tell a true story of the difficulties encountered and overcome. At De Sota, Mo., a creek overflowed its banks and the water was running very

swiftly. Waiting for the tourists were several teams with which the farmers expected to pull the trucks across the stream.



A Big Truck Leaves Its "Footprints"

But, even with the water to the tops of the wheels the entire way across and well over the frames in the center, the muddy crossing was accomplished without

animal aid. Several of the trucks not only made it under their own power but assisted others with tow ropes.

On the Illinois side the company met its greatest hindrance in the bottomless seas of gumbo, between Anna and Du Quoin. There the trucks emerged from one hole only to drop in to the axle in another a few yards beyond. And such mud! In tenacity it resembled chewing gum more than anything else. To go 11 miles between Murphysboro and Elkhville, it required 16 hours. Between Anna and Carbondale many of the drivers spent a full 24 hours at the wheels without a bite to eat.

But the tour was a greater success because of these adverse conditions than it would have been otherwise. To the people along the route, it furnished tangible evidence of the stamina that is actually being built into modern trucks. It proved to them without question, if it were possible for trucks to pull loads over such roads as existed, that hard-surfacing would guarantee dependable transportation regardless of the weather or the season.

Hudson Motor Specialties Company, 1932 Arch Street, Philadelphia, Pa., has added a printing plant to its large equipment, and from now on will produce its own printing for its nation-wide campaigns for its complete lines of Hudson specialties for the Ford.



This Road is so Shaded by Trees That It Seldom Dries Out  
A traffic truck pulling its way through



A Hill Road Between McClure and Carbondale, Illinois  
Ruts partially filled with straw to help traction





# INTEGRITY CLARK AXLES

Integrity is the realization of a high ideal in actual performance—a perfect balance—as exemplified in the design and performance of Clark Axles for Motor Trucks.

CLARK EQUIPMENT COMPANY  
Buchanan, Michigan

## *For Motor Trucks*

## The Jenkins Vulcan Spring Company Passes Ten-Year Mark

**J**UST one month ago the Jenkins Vulcan Spring Company, of Richmond, Indiana, celebrated its tenth anniversary as a pioneer in the spring replacement business. Although it is now ten years since the company assumed its present corporate form, Vulcan springs had their beginning sixteen years ago in Sumter, South Carolina, where they were fitted to the famous Cadillac single-cylinder model.

In 1907, the trade name VULCAN was chosen as being representative and easily remembered.

Following insistently his idea of developing this business to its fullest extent, Mr. Jenkins closed out entirely his automobile sales business, and ten years ago, on the 15th of July, 1910, it was decided to enlarge the scope of the business, and to deal exclusively in spring replacements on a national scale, with headquarters and

more than twenty years actively engaged in leaf spring production, and was for twelve years Superintendent of the Spring Division of the Detroit Steel Products Company.

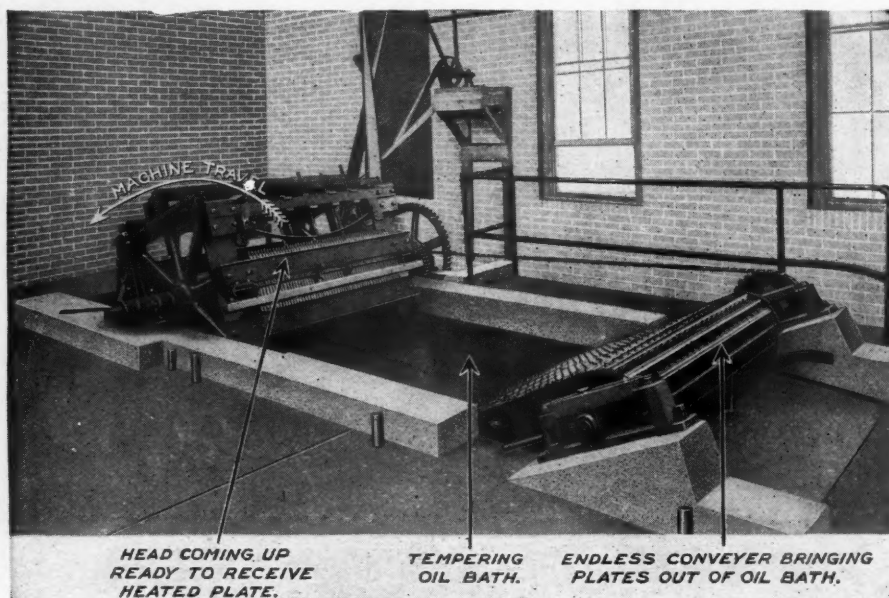
D. T. Hersey is Director of Sales. Mr. Hersey was for a number of years actively connected with the Splittorf Electrical Company in the capacity of Assistant General Manager of Sales.

The replacement spring business has reached very large proportions and is today one of the principal factors in the automotive industry. It is estimated that there are several million springs broken annually in the United States, the breakage being directly traceable to three causes: First, poor workmanship in the springs themselves; second, irregular surfacing on the roads; third, overloading.

There are other causes, such as excessive speeding and improper design of the springs themselves with reference to the work they are called upon to perform, and neglect of the spring, as for instance, inattention to lubrication and the tightening of clip bolt nuts, etc.

A trip through the Jenkins Vulcan factory is a most interesting and informative experience. The equipment is modern in every respect, and some of the special machinery used is of the company's own exclusively patented designs. The manufacture of springs in itself is a most interesting study, and the layman is accustomed to taking for granted a number of things, with reference to the making of the spring, which as a matter of fact, require close scrutiny and care.

It is with truth stated that a man can lift in one hand, \$1,000,000 worth of watch hair-springs. That value represents little more than the skill and care exercised in manufacture, and inasmuch as one man can lift such a large value, it is sufficient argument that the raw material itself is insignificant except as to correct formula of analytical content. In like degree it is important that the utmost care be taken in the making of a thoroughly good automobile leaf spring.



**Spring Leaf Forming and Tempering Machine, Which Insures Even Temper of Each Leaf**

This is one of the many similar types of automatic machine used by the Jenkins Vulcan Spring Co.

This company is today operating a large plant which is devoted exclusively to the manufacture of high-grade springs for replacement purposes, and is specializing on that class of work, studying carefully the needs of the business as to quality and types of springs, maintaining a distribution which places the needed spring within reach of any without delay.

T. B. Jenkins, President of the company and the original founder of the business, commenced his business career as a bicycle dealer, having a very small shop in Sumter, South Carolina, immediately after his discharge from the Army at the close of the Spanish-American War. The business was very small in the beginning, but at once began to realize substantial growth. It was in 1903 that Mr. Jenkins embarked in the automobile business as a side line to his bicycle business. In a few years the bicycle business was closed out, and his entire effort and capital directed toward the building up of an automobile agency.

The very first springs that were sold for replacement purposes were sold in 1904 for the one-cylinder Cadillac, for which Mr. Jenkins had the agency in a number of counties.

From the very beginning the possibilities of this particular department of the automotive business were recognized.

factory in Saint Louis. From that date, the business was known as the Jenkins Manufacturing Company. In October, 1917, the company was reorganized with a capital stock of \$500,000, the new corporate name being the Jenkins Vulcan Spring Company. Factory and headquarters were located in Richmond, Indiana, the present center of activity for the Company, which now operates seven of its own branches in the principal strategic centers of distribution. The production today is approximately 600,000 springs per annum, and will be much larger when raw material can be obtained. The stock of springs that must be carried on hand for a proper maintenance of the service is nearly 4,000,000 pounds, about 30% of which is distributed in seven branches, the remainder in the stock rooms of the company in Richmond.

Mr. Edgar F. Hiatt, Vice-President and General Manager, formed his connection with the business about one year ago. Mr. Hiatt forsook a banking career of acknowledged prominence and high promise to come actively into the manufacturing and distributing field, which offered even greater possibility of substantial development.

Recently the company has connected with it, in the capacity of Production Manager, Mr. A. L. Ellis, who has been

### Diamond T Sales Convention

The Diamond T Motor Car Company, held its annual Distributors' and Dealers' Convention in Chicago recently. One hundred and twenty dealers from almost every state in the Union attended, the Pacific Coast being especially well represented.

The freight strike and general lack of adequate transportation, and the shortage of labor on the farm furnished the inspiration for a number of interesting talks. Among the more prominent speakers were—D. H. Merrick of the Great Lakes Trust Company; A. R. Kroh of the Goodyear Tire & Rubber Company; W. S. Bacon of the Oliver Till Plow Company. The keynote of the convention was the emphasis of the motor truck as an essential to national progress and development.





# YOU!

## Mr. Dealer in 1930

**WHAT** will your truck tire business be ten years from now?

Will your establishment have prospered by your business foresight and good buying judgment?

Build your foundation now on the bed-rock of success by stocking the two biggest sellers on the truck tire market today.

**The New Mono-twin**—a grainless, non-splitting, solid truck tire on a single large base, possessing all the advantages of both the single and dual, without the disadvantages of either.

**'Nobby Cord'**—the pioneer pneumatic truck tire—a sturdy, heavy-duty tire that guarantees your trade a saving in every phase of truck operation.

*Stock now for a big demand*

*'Nobby Cord'*

*Mono-twin*

**United  
States  
Tires**  
are Good Tires



## Federal Reserve Encourages Reasonable Motor Truck Credits

**I**N response to urgent requests for some definite ruling concerning the discounting by banks of motor truck paper, the governors of certain important Federal Reserve districts have announced a position which appears to be most favorable to the motor truck industry.

The common excuse among bankers for refusing credit on motor truck paper is certain supposed rulings of the Federal Reserve Board. Statements made by some of the governors, however, show conclusively that there is no ruling of the Federal Reserve Board which restrains any banker from extending all reasonable credit to motor truck buyers.

David Thomas, general manager of The Motor Truck Manufacturers' Association, says: "The position which the Federal Reserve Board has taken is most satisfactory to the motor truck industry. It is not discriminating for or against any industry by name. Its position is so clearly stated that if the motor truck were fully appreciated by the public and the bankers, there would be no motor truck credit difficulties."

Mr. Thomas also quotes from a letter written by Governor Harding of The Federal Reserve Board, in Washington, D. C., to Senator Owen. In part, the letter reads:

"The Board is insisting that all banks use a discriminating judgment in making loans, giving preference to those which are necessary for the production and distribution of the basic necessities of life, such as clothing, food and fuel."

In the opinion of Mr. Thomas, the transportation advantages of the motor truck alone entitle it to favorable consideration by bankers, according to the

above letter. He also quotes from a statement by the Federal Reserve Board in May showing the latitude allowed bankers in extending such credits. The statement reads:

"It is the view of the Board that while Federal Reserve Banks may properly undertake in their transactions with member banks to discriminate between essential and non-essential loans, nevertheless that discrimination might much better be made at the source by the member banks themselves. The individual banker comes in direct contact with his customers because of his familiarity, not only with the customer's business, but with the general business condition and needs in his immediate locality. In making loans he is bound by no general rule of law as to the character of the purpose for which the loan is being asked. He is entirely free to exercise discretion and make one loan and decline another as his judgment may dictate."

In order to further corroborate the above statement, Mr. Thomas submits a letter which he received from Mr. M. B. Wellborn, Governor of The Federal Reserve Bank at Atlanta, Ga. The letter reveals a wide and constructive knowledge of the country's needs and a thorough comprehension of the value of the motor truck as a means of transportation and production. It reads in part as follows:

"Replying to your telegram with reference to my views as to the action of The Federal Reserve Bank in Atlanta in connection with rediscounting automobile paper and the distinction made between what is termed pleasure automobiles and trucks and tractors—the credit situation at this time is such that I feel we have

reached a point where it is imperative that we should have an intelligent and discriminating policy of control over credits, especially those extended for pleasures and luxuries, and for that reason we are restricting credits for financing the purchases of pleasure automobiles.

"I think that at this time when transportation facilities are so badly crippled we are doing a useful public service in continuing to grant credits for financing trucks and tractors.

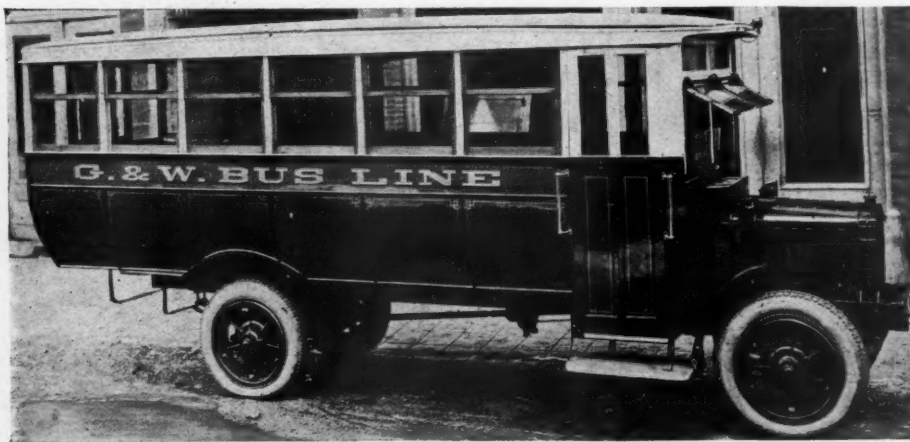
"At the present, the credit situation is pretty closely interwoven with transportation; commerce being tied up, due to lack of transportation of necessary goods. The false policy of the public for years past in regard to the common carriers injured them to the extent that their credit has been greatly impaired and the public is now suffering as the result of their treatment of the railroads.

"I feel that anything that can be done to encourage production and the sale of motor trucks will be of real value to the transportation problem; and in view of the shortage of farm labor and the necessity for increased production of food-stuffs. I think the entire country will benefit from the manufacture and sale of tractors.

"Very truly yours,  
(Signed) M. B. Wellborn,  
Governor."

In the last analysis, according to Mr. Thomas, "when banks refuse motor truck paper on the ground that it is prohibited by rulings of The Federal Reserve Board they are merely 'passing the buck.' It is clearly up to the local banker to accept or reject motor truck paper."

Brussels has made arrangements for its first post-war show, to be held in the Palais du Cinquantenaire, Dec. 10 to 19.



**New Transit Style Bus Body; Combination Seats**

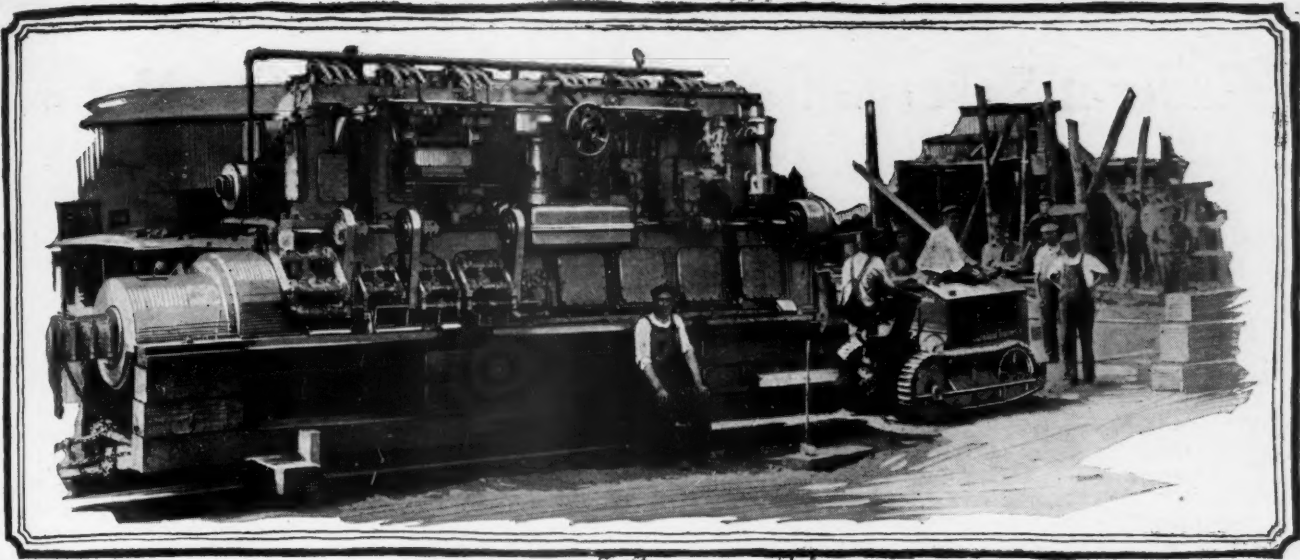
This standard body, manufactured by the Paterson Vehicle Co., and mounted on a Winther chassis, is fast gaining popularity through the more prominent cities of Connecticut and New Jersey when they are engaged in regular city and inter-city transportation, which takes on both long and short trips. It is fitted with combination seats, consisting of one side seat along the right side and one long seat across the rear end. Also five double cross seats along the left side of body and individual driver's seat. Gas tank located in left front end and boxed. Hand signal window at left of driver. Vestibule folding front door and easy steps. Electric dome lamps and buttons, polished grip handles, grooved floors, noiseless windows fitted with pullman spring catches, etc. Nicely painted and finished. Passenger capacity, 25 seated and 10 standing. 215 inches from dash to rear end.



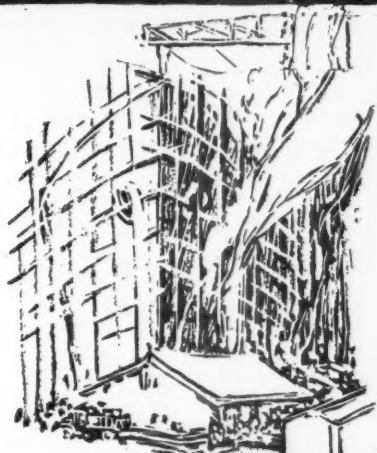
**Interior View**

This view shows the arrangement of combination seats in the new transit style bodies. Open bottom seat construction for package room, etc., grooved non-slip floors, cross seats nicely proportioned with pressed steel pullman pedestals. Polished grip handles and celluloid roof handles. Upper side corners fitted with metal advertising racks for cards. The company furnishes this style of seating in three standard sizes: 16, 25 and 35 capacity.





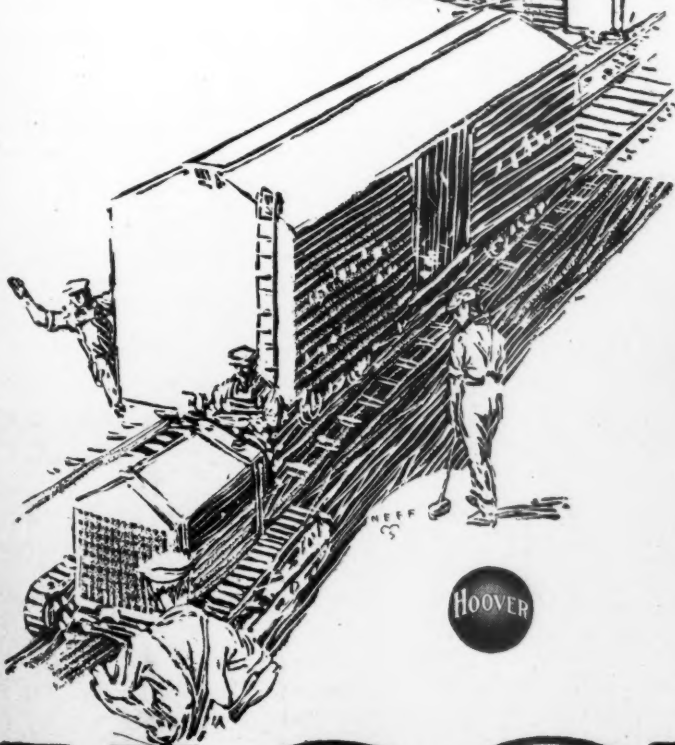
*The Cletrac Hauling a 27-Ton Diesel Engine*



Like pulling a toy express wagon—this is how well-poised ball bearings working on little steel balls make the hauling of the huge monsters of steel for modern industry.

By devoting unceasing effort in research and manufacturing, Hoover Engineers have produced Hoover Steel Balls of such perfect roundness and fineness of finish that they make easier work of hauling huge machinery.

**HOOVER STEEL BALL COMPANY**  
Ann Arbor Michigan



**HOOVER**  
**STEEL BALLS**

## Great Enlargement Program for International Motor Truck

**T**HE International Motor Truck, which has increased its sales volume fifteen hundred per cent since 1914, is to be put into greatly extended production Harvester Company officials have just secured a site for the erection of the largest motor truck plant in the world.

Cyrus McCormick, Jr., works manager, who will have charge of the construction, equipment and operation of this new development, announces that the site of the new plant, which will be in addition to Akron Works, is at Fort Wayne, Ind., about three and a half hours' ride from Chicago and on the N. Y. C. & St. L.,

Wabash, Pennsylvania, New York Central and Ohio Electric railroads. The facilities for International Motor Truck manufacture and distribution were investigated in twenty-eight industrial centers in the United States before the Fort Wayne site was selected.

Fort Wayne's position is favorable geographically and its railroads and their connections are the most completely supplied with that special equipment which is needed for delivering International Motor trucks to the company's dealers and distributors the country over and to the 107 International Harvester branch houses in the United States and Canada.

Best of all, the spirit of Fort Wayne and the co-operation of her people and organizations are most favorable to the development of the largest and most productive motor truck plant in the world. A truly great factory must consist not only of adequate buildings and equipment, employes and pay roll, but must furnish also a proper environment of homes, institutions and people.

There is an arrangement between the International Harvester Company and the Fort Wayne Chamber of Commerce for the completion, as the first quota, of 1000 new homes for International Harvester men and their families. These homes will not be concentrated in an industrial home center, but will be distributed among a number of attractive suburbs. These groups of homes in their various locations will each become the nucleus of a suburban community which will attract in a normal way residents from various walks of life and such commercial facilities as are normally needed in the life of a residence community. The houses will not be constructed along lines of monotonous regularity, but will be diversified as to plan and style of architecture.

The buildings of this new twenty-fourth plant will embody the improvements of every important modern automobile and motor truck plant in the United States. It is the determination to combine all noteworthy individual merits of America's successful manufacturing establishments into this super-truck plant in order to make it as nearly perfect as practical and scientific ingenuity can devise. Health and comfort of the workers and ease, efficiency and perfection of work will be the major ends involved. The machinery and equipment will follow the same principle and no expense or pains will be spared to equip the great plant for the happiest and most satisfied workmen and for making the best and most economical motor truck which can be built.



Nantoon, Model Chinese City, Patterned After American Cities

Mr. Chang Chein, former minister of commerce and agriculture, who sailed last week for Nantoon, China, bought six Rainier trucks equipped with omnibus bodies and having a capacity of 30 passengers each. These omnibuses, which are being shipped to Nantoon the only means of transportation in this city. Nantoon, while an old city, is being rebuilt along the lines of some of America's leading cities. The business houses and many of the homes are electrically equipped. Other improvements include a new police system, industrial and common schools, modern banking houses and splendid new office structures. Before sailing Mr. Chein signified his intention to concentrate on the transportation problem. The Rainier omnibuses will operate by a company controlled by Mr. Chein and will have definite routes and schedules. They will be placed on exhibition as soon as Mr. Chein arrives in Nantoon in commemoration of his 70th birthday.



A Traveling Cigar Store

The latest thing in specialized delivery equipment is the Federal truck equipped with a complete traveling cigar store, with all its departments inside, recently put into operation for C. L. Hulett, wholesale tobacconist, of Troy, N. Y. The company does a great deal of business, not only with the many retail stores in Troy handling cigars, cigarettes and tobacco, but with stores in all the neighboring towns. This business necessitates daily deliveries, and to enable a sufficiently varied stock for the retailer to make his selection right from the truck, thus doing away with a great deal of the bother of double record-keeping on so many small orders, this system was installed. It also keeps the expense of the shipping department lower, through the unnecessary handling of so many small packages which it does away with. The body is painted in bright pall-mall color, with gold lettering and trimmings, while all metal parts, such as radiator, tank and guard, lamps, hub caps and steering column are nickel-plated. Tires are pneumatic all around.



# The Resiliency is Built in the Wheel



## Another One of 500 Truck Dealers Who Sell and Endorse Sewell Cushion Wheels

FEDERAL

*A Size for Every Business**Continental*UPHOLSTERING  
LETTERING  
PAINTING

**WM. L. SCHUPP & SONS**  
**WAGONS AND MOTOR TRUCKS**  
 SPECIAL HIGH GRADE TRUCK AND BUS BODIES  
 FOR ANY CHASSIS

314-321 CENTRAL AVENUE  
 AND MADISON AND CHASE STS.  
 ALBANY, N. Y.

KELLY-SPRINGFIELD  
AND FIRESTONE  
TIRES

Sewell Cushion Wheel Co.,  
 Detroit-Michigan.

Dear Sirs:-

We are very much pleased with the way  
 our co-operative sales arrangement is working out.

Our experience over the past three years  
 has proven that whenever a Federal truck leaves our  
 sales room equipped with Sewell Cushion Wheels that it  
 means another well satisfied customer, and we cannot  
 help but recognize that our own as well as the  
 customers service bills are greatly reduced.

We have been handling Sewell Cushion Wheels  
 for a little over three years, and it is gratifying  
 to note the number of repeat orders we are receiving  
 for Federal trucks to be equipped with Sewell Cushion  
 Wheels.

The co-operation given us by your represent-  
 ative Mr. D.H. Tiffany is fully appreciated by us and it  
 is our earnest hope that we may always continue our  
 pleasant and most satisfactory business relations.

Assuring you that we shall continue to  
 endorse Sewell Cushion Wheels not only to our trade,  
 but to any motor truck dealer who may choose to call  
 upon us for information regarding yourselves or your  
 product.

LWS/LS

Wm. L. Schupp &amp; Sons.

by

*Louis Schupp*

### Sewell Cushion Wheel Company, Detroit, Mich.

# Taken From Current House Organs

## The Banker's Interest in the Truck Industry

The banker is ultimately as greatly interested in the purchase of motor trucks as the man who purchases them. The success of the banking business depends entirely on the successful operation of the various businesses in his locality; and the successful operation of a great many business houses depends largely upon the degree of efficiency they are able to attain through the use of motor trucks.

Therefore, a great many of the leading bankers throughout the country have made exhaustive investigations relative to the motor truck and its adaptability and importance in connection with the different lines of business embraced in their particular community.

In other words, they have studied the truck business and have found it profitable for the dealer and beneficial to the entire community where it is represented. Profitable to the dealer because he is selling an article for which the demand results from necessity; consequently the demand is permanent, not temporary. Beneficial for the reason that a motor truck installed in a business increases profits by lending efficiency to the business organization.

The resultant attitude of these bankers has been to endorse the truck business and encourage it in every way possible. They have advised capable dealers to arrange to represent a truck of real merit in their locality, and where it was necessary have assisted the dealer financially.

They have also advised different business institutions to install motor trucks where they considered such equipment essential, and have given financial assistance where it is needed to make the installation.

For a number of years after the advent of the automobile into the business world it was looked upon by the banking interests of the country with disfavor. Or, in other words, the automobile was considered an expensive luxury, and the business of manufacturing and selling automobiles a "game" rather than a business, and for that reason bankers would not endorse it.

In this respect the truck differs from the automobile. The motor truck has always been considered an essential in many lines of business in certain localities, but the development of the truck industry to its present day stage has been brought about more by existing conditions than any other one thing.—By F. C. French, Patriot Progress, Patriot Motors Co., Lincoln, Neb.

## Earnestness

Whatever you fry to do in life, try with all your heart to do well; whatever you devote yourself to, devote yourself completely; in even the smallest as well as in great undertakings, be in earnest.

Never believe it possible that any natural or improved ability will gain in the end, unless associated with the qualities of steady, plain, hard work.

Sometimes talent and fortunate oppor-

tunity form the two sides of the ladder on which men mount, but the rounds of the ladder must be made of stuff to stand wear-and-tear, and for this there is no substitute for thorough-going, ardent and sincere earnestness.

Never put your hand to anything into which you cannot throw yourself, body, soul and mind; and having chosen your work to do, never affect depreciation of it.—Republic Radio, Republic Truck Sales Corp., Alma, Mich.

## Figures Show Merchant Must Use Economical Methods

Not so many years ago, haulage was a minor factor in the conduct of a business. It didn't seem to cut much figure in the fixing of prices. Today, the business man knows to a fraction what allowances he must make for transportation. Economical transportation, he knows, is a big asset in keeping down prices, which is another way of saying that economical transportation is essential if he is to meet competition.

Just how large a part transportation plays in the conduct of a business is shown in a table recently appearing in the Chicago Tribune. It presents the percentage of financial outlay that is chargeable to delivery of the product in 14 different lines of business. It impresses on the business man the necessity of using the most economical delivery equipment he can find. The table follows:

Ice .....	45.8%
Soft Drinks .....	20.2%
Brick .....	19.9%
Bakeries .....	19.8%
Laundries .....	15.3%
Coal and Wood .....	15.2%
Ice Cream .....	14.9%
Dairy Products .....	12.1%
Lumber .....	6.8%
Groceries and Meats .....	4.4%
Hardware .....	3%
Furniture and Carpets.....	2.8%
Department Stores .....	1.5%
Wholesale Meats .....	1.1%
—The Punch, Maxwell-Chalmers, Detroit, Mich.	

## Good Roads and Truck Operation

First, of course, it should be stated, that good roads are tremendously important and that the better the roads the better the performance will be, other things being equal.

But in the effort to get good roads, is it not true that somewhat of an impression has been created that the present day trucks are not fit to operate where roads are bad or where there are no roads at all, and that, consequently a man in that position had better stick to horses and mules?

After reading all the articles one has seen lately that are evidently inspired propaganda with a view of hastening the development of good roads, one is left rather with the impression that trucks are not safe and that the development of the motor truck had best be held up till roads are made good all over the country.

We know, of course, that any truck will operate better on a good road than it will on a poor road—but the big point is that a good truck, if bought right—by that meant that if the truck used is one that is built for the right kind of work that it has to do—will show an economy over horses and mules or any other form of transportation under the same conditions.

That is the big contribution of the truck to the business men of America—it provides cheaper transportation on roads as they are today, carrying the kind of merchandise which we have to move today with the kind of men we must employ to drive them.

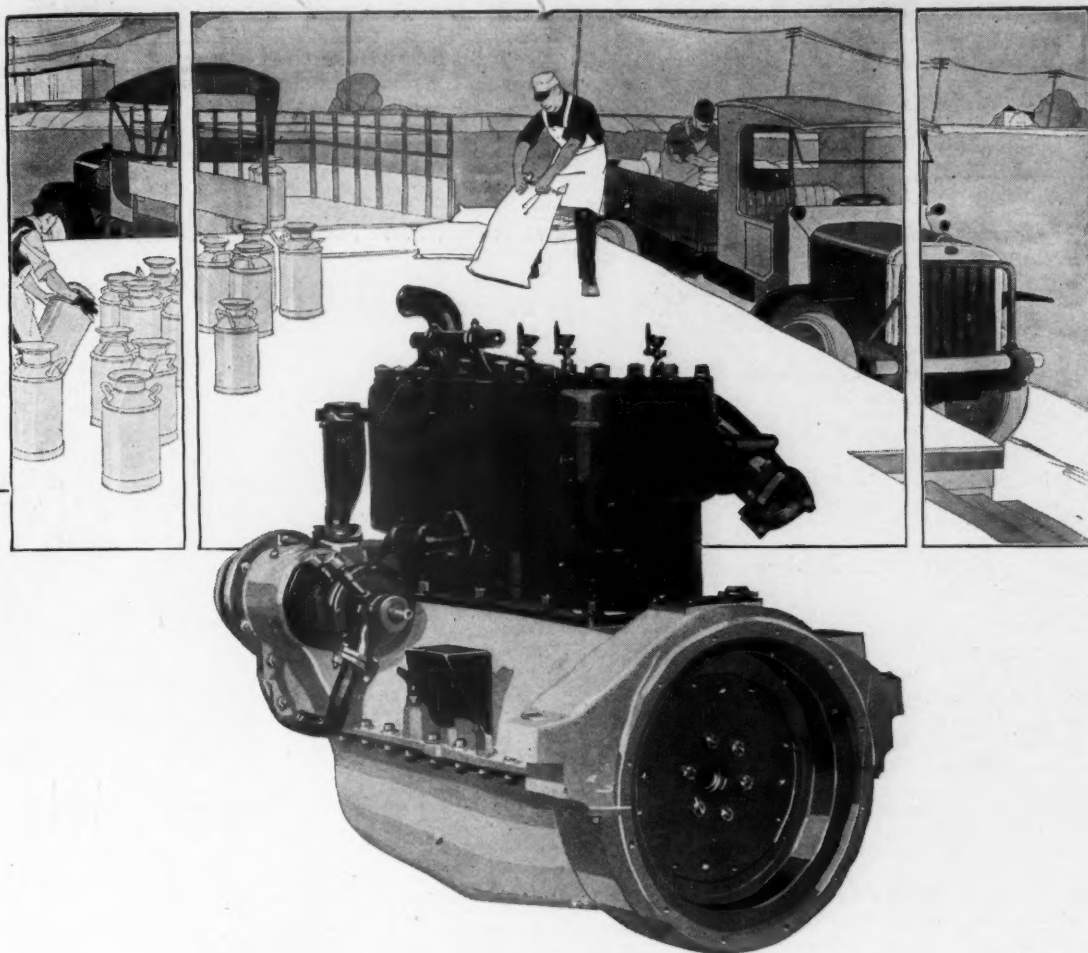
Take trucks, for example, which operate in the logging industry; which are used for road making; which operate in the oil fields; in use by telephone companies in stringing lines over new territory—and the hundred and one purposes for which trucks are used where roads are not good—these show the every-day economy and value of the truck.—By H. M. Lee—Duplex Doings, Duplex Truck Co., of Lansing, Mich.

## This Truck is Being Used for Transportation Service on an Island Only 700 Miles South of the North Pole.

The island of Spitzbergen, one of the farthest islands north to be inhabited, boasts of its first motor truck. It bears the license Spitzbergen 1 and was recently shipped to that country, from Christiania by John Colbjørnsen, Norway, dealer for the Four-Wheel-Drive Auto Co., Clintonville, Wis. The truck, which is an FWD 3-ton model has been purchased by the Norwegian Spitzbergen Coal Co. and will be used in the transportation of goods.





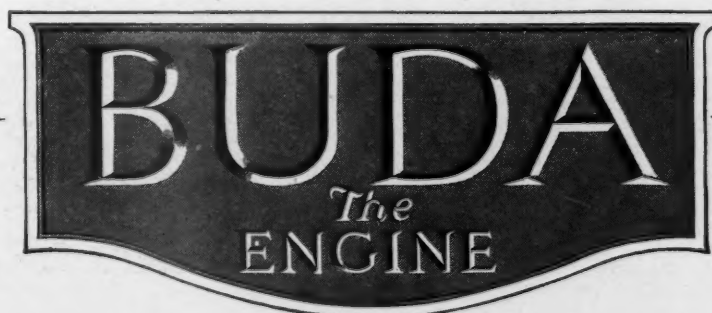


**T**HE increasing number of trucks purchased on the basis of Buda engine equipment indicates the growing recognition of Buda stability, long life, and low cost operation.

The perfected Buda oiling system, hand-scraped main and connecting rod bearings, the extra wiper ring on the pistons, and the intake manifold which vaporizes indifferent fuel, all contribute to the notably smooth and reliable action of the Buda engine.

Placing performance ahead of price, more than eighty-seven representative automotive manufacturers are today using the Buda as standard engine equipment.

THE BUDA COMPANY, HARVEY CHICAGO ILL.  
SUBURB  
ESTABLISHED 1881



Edward L. Allis has become manager of eastern sales for the Corcoran Mfg. Co., makers of Peerless radiators, fenders and tool boxes for Fords.

Harry A. Biggs is now vice-president of the Studebaker Corporation, South Bend, Ind.

G. J. Brittain has been appointed vice-president and general manager of the Canadian Fairbanks-Morse Co., Ltd., with headquarters in Montreal.

L. N. Burns, who is with the Racine Auto Tire Co., Racine, Wis., has been made head of the Horse Shoe Rubber Co. of Missouri, distributors for Horse Shoe tires for Kansas and Missouri. Mr. Burns is financially interested in the Racine Auto Tire Co., and has been very prominent in the farm implement and tractor field.

Dave D. Cahn has been elected vice-president of the Southern Motor Manufacturing Association, Houston, Texas.

R. E. Clingan has been appointed general manager of the Bock Bearing Company, Toledo, Ohio, a division of the Standard Parts Company.

B. W. Collins, sales manager of the Parker Axle Co., New York, has resigned, to accept the position of vice-president and general manager of the Non-Ferrous Casting Corp., Chicago. This company's products will be sold exclusively through the D. K. Moore Company, Cleveland, Ohio.

Bernard DeWeese, formerly with Kilbourne & Jenkins, Columbus, Ohio, dump body makers, is now sales engineer for the Columbus Axle Co.

K. P. Drysdale, for over twelve years with the Cadillac Motor Car Co., the last ten years as advertising manager and recently for two years director of sales for the Cleveland Tractor Co., has joined the advertising agency of Brooke, Smith & French, Inc., Detroit, Mich., as special advertising and merchandising counsel.

William Elliott, since last February head of sales promotion and market analysis for the Packard Motor Car Co., New York, has been made advertising and sales promotion manager.

P. L. Emerson, for three years general sales manager for the Olds Motor Works, Lansing, Mich., has acquired a financial interest in Jackson Motors, Inc., Jackson, Mich., and has become head of the sales organization.

Rex H. Finney has been made western sales manager, with headquarters in Denver, Colo., for the Corcoran Mfg. Co., makers of Peerless radiators, fenders and tool boxes for Fords.

Harry G. Greene, who has been vice-president and general manager of the Lewis & Greene Motor Co., Chicago, state distributors for the Oshkosh Motor Truck Mfg. Co., has resigned, and has been appointed district

## Personal Items

sales manager for the factory with headquarters at the factory's Minneapolis branch, covering northwest territory.

A. H. Grayburn, for the past four years assistant to the vice-president of the Norma Company, Long Island City, N. Y., has been made assistant secretary and assistant treasurer.

Alfred K. Hebner has been elected president and Dana H. Torrey secretary and treasurer of the Bearings Service Company, Detroit, Mich. They have both been with the company since its inception. Mr. Torrey has been in charge of the sales work from the beginning. Mr. Hebner will retain the title of general manager, as well as president. W. J. St. Onge, formerly with the Wire Wheel Corporation, succeeds Mr. Torrey as sales manager. The company has thirty-three branches, and over one thousand distributors, and acts as the service department of the Timken Roller Bearing Company, the Hyatt Roller Bearing Company and the New Departure Manufacturing Company.

James E. Haab, formerly factory representative, has been assigned the northwest district for the Rubber Products Co., Barberton, Ohio.

Joseph L. Hardig has become advertising manager of the motor bearings division, Hyatt Roller Bearing Company, Detroit, Mich. He will direct all advertising activities of his division, which covers the automobile and truck fields.

Chester F. Hockley, formerly vice-president and general manager of the American Hammered Piston Ring Co., has been elected vice-president of the Bartlett-Hayward Co., Baltimore, Md., which company took over the former concern about a year ago.

William H. Kreeb, southern district manager for Master trucks since that branch was established, has severed his connection with the truck company and is in business, under his own name at Sixth and Vine Sts., Cincinnati, Ohio, as a jobber of automotive specialties.

A. L. Martin has become general sales manager of the Hamilton Motors Company, Grand Haven, Mich., makers of Apex trucks.

C. E. MacTavish, who has been for the past year parts and service manager of the Chevrolet Motor Co. of Canada, Ltd., and previously sales manager of the Chevrolet Motor Co., at Regina, has been appointed sales manager of the Samson Tractor Co. of Canada, Ltd., Oshawa, Ontario.

J. E. Maloney has been made general manager of the Hydraulic Pressed Steel Co., Cleveland, Ohio.

J. E. McGinnes has been placed in charge of sales promotion work for the India Tire & Rubber Co., Akron, Ohio. He was formerly branch manager for the Firestone, in Milwaukee, and was also manager of sales for the General Tire & Rubber Co., Akron.

H. H. McCullough has resigned from the Emerson-Brantingham Tractor Co., Rockford, Ill., and is now sales manager of the Anderson Automobile Co., Rock Hill, S. C.

Jean Nahmelman has been made sales manager of the Madison Tire & Rubber Co., 20 West 60th St., New York. Sylvan E. Well will continue assistant sales manager.

Charles I. Ochs has been promoted to general manager of the Eaton Axle Co. He has been assistant general manager, axle division of the Standard Parts Company. As general manager he has charge of three large units, the new Eaton factory, the West Eighty-third Street Cleveland, Ohio, plant, and the Cincinnati, Ohio, plant.

Thomas P. Orchard has resigned as secretary and sales manager of the Service Engineering Co., Inc., to accept an appointment as director of sales with the Arthur Knapp Engineering Corporation, New York, and Detroit, Mich.

J. H. Quackenbush has been appointed assistant and general sales manager of the American Hammered Piston Ring Co., Baltimore, Md.

Harry A. Raseley has left his work as sales manager for C. E. Johansson, Inc., Poughkeepsie, N. Y., to become export sales manager for Nordyke & Marmon Co.

Allan A. Ryan has resigned as director and chairman of the board of the Stromberg Carburetor Company of America.

Walter H. Schimpf has been made sales manager for A. H. Lyons & Co., Philadelphia, manufacturers of the Lyons storage battery. Mr. Schimpf has been a prominent figure in the trade, especially around Philadelphia. He has been in the business since 1899, and has held the eastern district managership of the Paige Motor Car Co.

W. G. Schultz, sales manager for the Sadow Motor Truck Co., Chicago, Ill., is on a business trip covering much of Europe, including Great Britain.

George Shortmeier has been appointed manager of the New York branch of the Madison Tire & Rubber Co.

Lawrence G. Spealman, who has been the Johansson representative in Michigan, has been made sales manager for C. E. Johansson, Inc., Poughkeepsie, N. Y.

R. D. Spradling has been made head of the recently organized expert sales department of the Diamond T Motor Car Co., 4503 West 26th St., Chicago. He comes from the Hydraulic Pressed Steel Co.

George Wagstaff has joined the sales force of the Central Steel Co., Massillon, Ohio.



**J. Albert McCollum**  
Sales manager of the Traffic Motor Truck Corp., St. Louis, Mo.



**R. Jackson Jones**  
European representative of the Traffic Motor Truck Corp., St. Louis, Mo.



**F. E. Blanchard**  
Assistant engineer of the engine division of the Buda Co., Harvey, Ill.



**Millard S. Binney**  
Advertising manager of the Traffic Motor Truck Corp., St. Louis, Mo.



**I**N the bearings sponsored by SKF its type of anti-friction bearings have been developed to their highest perfection. And SKF further provides an engineering service not only to assume to itself proper application and use of SKF products, but to help the buyer to fully capitalize the mechanical value built into each device. This service is freely offered and is being continually broadened and advanced by laboratory research that is international in scope. You are assured a similar service behind every product bearing the mark—

# SKF

*Among the SKF products now offered are:*

Single row deep-groove ball bearings  
Double row self-aligning ball bearings  
Steel balls  
Transmission equipment

**SKF Industries, Inc.**  
165 Broadway, N.Y.C.

Supervising at the request  
of the stockholders

**The Hess-Bright Manu-  
facturing Co.**  
Philadelphia, Pa., U.S.A.

**SKF Ball Bearing Co.**  
Hartford, Conn., U.S.A.

**Atlas Ball Co.**  
Philadelphia, Pa., U.S.A.

*SKF Research Laboratory,  
established at Philadelphia,  
to co-operate with the big  
Gothenberg Laboratories in  
the study of the American  
manufacturers' friction  
problems.*



William H. Walling will be in charge of direct-by-mail advertising for the Packard Motor Car Co., New York, and Bert C. Chambers will have charge of publicity and display advertising.

B. B. Wolfe has been made district sales manager for New Jersey, Delaware, Pennsylvania, Ohio and West Virginia of the American Hammered Piston Ring Co.

B. R. Winborn, general manager of the jobbing division of the Standard Parts Co., has resigned, effective September 1st. He joined the company as sales manager of the perfection heater division, and his record with the jobbing division has been unusually successful.

### Personal—Retail Trade

Roy S. Davey has been made general sales manager of Graham Brothers Sales Company, Inc., 1890 Broadway, New York, distributors of Bethlehem trucks. Mr. Davey was general sales manager of the Bethlehem Motors Corp., Bethlehem, Pa.

S. D. Highleyman, for twenty years connected with the farm machinery industry, has been appointed manager of the Indianapolis branch of the Emerson-Brantingham Implement Co., with territory covering Indiana and other parts of Michigan and Kentucky.

O. D. Upton, until recently district manager of the Republic Rubber Co., at Kansas City, Mo., is now the New York manager of the company, succeeding Frank G. Hill, resigned.

### New Incorporations

Calumet Motor Co., Houghton, Mich., has been organized with \$100,000 capital for manufacturing fractional horsepower motors. Production by November 1 is predicted.

The Rubber Corporation of America, recently formed, with general offices at 240 West 55th St., New York, has taken over the entire sales and selling organization of the Sterling Tire Corporation, and the Empire Rubber & Tire Company. Francis I. Reynolds is president and general manager, and Charles Austin Bates, well known in the field of advertising and sales promotion, and chairman of the executive committee of the Sterling corporation, is vice-president and advertising director.

The Cole Tractor Co., Charlotte, N. C., has been formed with show and salesroom at 7 East Fourth St. The company will represent the Allis-Chalmers Tractor Co., Milwaukee, Wis., for the southeastern states.

The Hercules Rubber Company, Cincinnati, Ohio, has been formed with \$1,000,000 capital, and a plant will be built for making inner tubes for automobile tires.

Ajax Motors Corporation has been formed in Massachusetts with \$5,000,000 capitalization, of 500,000 shares of common stock at \$10 par value, by Chester I. Campbell, secretary of the Boston Auto Dealers' Assn.

The H. C. Zaun Tire & Rubber Co., Inc., New York, for manufacturing tires, has been formed, with \$100,000 capital.

The Missouri Motor Equipment Corp. has been formed in Dover, Del., with capital of \$600,000.

The Temme Spring Corp. has been formed at Wilmington, Del., for manufacturing springs for automobiles, with capital of \$2,000,000.

The Service Spring Co. has been formed at Wilmington, Del., for manufacturing automobile springs, with capital of \$750,000.

The Union Auto Supplies Co., has been formed at Wilmington, Del., with capital of \$1,000,000.

The Anderson Tire & Rubber Co. has been formed at Wilmington, Del., to manufacture and sell automobiles; capital \$7,000,000.

The General Guaranty Co., Wilmington, Del., has been formed, to deal in automobiles; capital \$4,000,000.

The Armington-Bradley Co., Wilmington, Del., to manufacture automobiles and tires; capital \$100,000.

### New Agencies

The Wilson & Vevera Corporation, jobbers, will represent the Parker line in eight Eastern states. Dealers will immediately be established in principal cities, and truck deliveries will start August 1.

The Nash-McLarty Motor Co. is the merger name of the McLarty Motor Co., and the Brown Automobile Co., Dallas, Texas, combined to handle Nash retail sales. Floor space of 27,000 sq. ft. becomes available with enlarged facilities. Capitalization is \$125,000.

The Western Automotive Company, 126 North Main Ave., Sioux Falls, S. D., with capital stock of \$100,000 is South Dakota distributor for Gramm-Bernstein trucks, and also controls part of Iowa and Minnesota. A complete supply of parts is kept in stock at all times. W. C. Brown is manager.

John & Arthur, Boston, Mass., a well-known accessory house, have been made New England distributors for Republic tires.

Jack Koran, 415 North Broadway, Oklahoma City, Okla., has secured the state rights for Penn spark plug distribution.

W. V. Harrington has secured distribution rights for Hare's Motors for Minnesota, with headquarters in Minneapolis.

Guy Sanders, of the Rochester Motors, has been named distributing manager for the Northwest for the Clydesdale Motor Truck Co., of Clyde, Ohio. Distributing centers include Seattle, Tacoma, Portland, Helena, Great Falls and Boise, with Spokane, Wash., which latter city will be the agency headquarters.

The Fidelity Motors, Inc., recently incorporated under Pennsylvania laws, with capital stock of \$250,000, has taken over the United Sales Co., distributors of Commonwealth cars, Huffman cars and trucks, together with the sales and service station at 4830 Market St., Philadelphia. George C. Henderson is president and will act as general sales manager.

### Trade Literature

The Hell Company, Milwaukee, Wis., recently issued a new pamphlet containing complete and compact information in the form of illustrations, generalities and specifications. It is known as the "Quality," and is designed to aid dealers to help prospects quickly determine the adaptability of Hell tanks, bodies and hoists to any particular kind of work the prospect may be interested in.

### Removals and Trade Changes

The Marathon Tire Co. has moved into larger quarters at 468 Milwaukee St., Milwaukee, Wis.

The Lambert "Trublruf" Tire Co., Boston, Mass., is at 823 Boylston St., and covers practically all the New England district as Lambert tire distributor.

Packard Tire Stores, Inc., Milwaukee, Wis., are now in more spacious quarters at 408 Jefferson St., formerly occupied by the Western Motor Supply Co. Besides being exclusive distributors for Iowa and Wisconsin, the company has contracted for Nebraska, Michigan, Minnesota, North and South Dakota.

The Oxweld Acetylene Company's export department has been moved from the Newark, N. J., factory to the Carbide and Carbon Building, 30 East 42nd St., New York. R. G. Noble is manager, and the department co-operates with the general sales department of the company.



Fred Crebbin, Jr.  
General Mgr., truck division,  
Stoughton Wagon Co.,  
Stoughton, Wis.



Alfred K. Hebner  
President of the Bearings Service  
Co., Detroit, Mich.



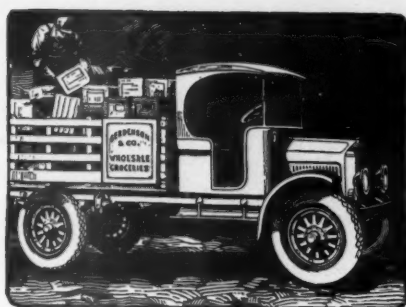
Joseph L. Hardig  
Manager, motor bearings division,  
Hyatt Roller Bearing Co.,  
Detroit, Mich.



George G. McFarland  
President, Harrisburg Motor  
Dealers' Association



# GARFORD



**F**AR-SIGHTED dealers see in Garford *Low Cost Ton-Mile* and the Garford Direct System of Service the two most important factors in truck merchandising of today and the future.

*Garford*  
Lima, Ohio

*Returns from an investigation among 4,000 Garford owners show 97.6% are 100% satisfied*

# TRUCKS

The Southland Tire Company's plant at Fort Worth, Texas, costing \$100,000 is expected to be completed by October 1. Machinery valued at \$250,000 will be installed, and a daily output of 600 tires and tubes will be made. This company is a subsidiary of the Texas Motor Car Association, and the tire plant is the first unit built by the association.

The American Chain Co., Inc., New York, had a meeting of stockholders on July 9 to reorganize the corporation that a stock issue of no par value may be made for capital increase. Under the plan the preferred stock will be increased from \$5,000,000 to \$10,000,000.

The United States Rubber Co. has decided to postpone its proposed issue of bonds, which was to wipe out its floating debt, and supply additional working capital, on account of the condition and outlook of the security market.

The Van Sicklen Speedometer Co., Newark, N. J., one of the subsidiaries of the Willys Corp., will begin the manufacture of speedometers as soon as its new factory is completed. The building will be eight stories high, afford 130,000 sq. ft. manufacturing space, and cost \$1,000,000. C. W. Curtiss, former general manager of the Splittorf Electrical Co., Newark, will have charge of the new factory.

The Southern Motor Manufacturing Assn., Houston, Texas, manufacturers of Ranger trucks, trailers, tractors and commercial bodies, will soon be in production with Ranger passenger cars. Fifty acres adjoining the plant site has been purchased for the development of a permanent housing plan for employees. A stock dividend of 10 per cent has been declared for all stockholders of record of August 31. Ground has been broken for two additional units, one 121 x 480, and one 75 x 150. When completed they will add 69,330 sq. ft. floor space to the permanent plant.

The Parker Motor Truck Company, Milwaukee, Wis., announce the closing of a contract with the Wilson & Vevea Corporation, 1482 Broadway, New York, involving the distribution of two thousand trucks.

The American Bosch Magneto Corp. will pay a 20 per cent dividend. Earnings for six months of 1920 are \$1,200,000, and 40,000 magnetos are produced monthly.

The Meyer Rubber Co., Columbiana, Ohio, has declared a regular quarterly dividend of 2 per cent to the stockholders of June 30.

The New Castle Rubber Co., New Castle, Pa., has asked its stockholders to consider increasing its capital stock to \$3,000,000. Six hundred employees are now at work, and 1000 will be required soon, it is predicted.

The General Tire & Rubber Co., Akron, Ohio, will build 1000 homes for employees on a 243-acre plot, one mile from the factory. Timber standing on the land will be used in building, and a bus line will operate to the factory.

The Automotive Parts Co., Indianapolis, Ind., maker of Hy-Duty radiator fans, is in its new plant, and has 20,000 sq. ft. additional facilities. Daily production of 850 to 1000 fans will be done as soon as possible.

The Electric Storage Battery Co., Camden, N. J., will hold a special meeting of stockholders to vote on increase of capital stock from \$18,000,000 to \$30,000,000. Shareholders may subscribe at par to the new stock, up to 20 per cent of their holdings of record of July 17.

The Wharton Motor Co., Dallas, Texas, Thos. B. Wharton, president, plans immediate erection of a \$300,000 plant and installation of \$100,000 worth of machinery for producing passenger cars, trucks and tractors.

The Gearless Motor Corp., Pittsburgh, Pa., is perfecting plans for the initial unit of its plant, costing \$1,000,000.

## Factory News and Capital Increases

The Rex Motor Car Mfg. Co. has increased its capital from \$250,000 to \$1,000,000, part of the increase to be used in erecting a plant in New Orleans, La.

The Victor Rite-Lite Company, Montclair, N. J., is increasing its capital from \$125,000 to \$3,000,000 in order to erect a foundry and other enlargements. Besides the light, which enables the lamps of a car to swing with the wheels, the company, having purchased the business of the Standley Non-Skid Chain Co., will take over national distribution of the Standley products.

The Federal Rubber Co., Cudahy, Wis., a suburb of Milwaukee, expects to occupy a new million-dollar factory addition, with six stories and basement, affording 200,000 sq. ft., by October 1.

The Brunswick-Balke-Collender Co., Chicago, Ill., will erect additions to its tire manufacturing plant at Muskegon, Mich., costing more than \$1,000,000.

Onelda Motor Truck Co., Green Bay, Wis., will have its advertising cared for by Lord & Thomas, Mallery Building, New York, and Read L. Parker will devote his time personally to the Onelda advertising account.

The Detroit Spring Products Company, 2250 East Grand Boulevard, Detroit, Mich., will, in its addition to the motor spring plant, have the largest motor leaf spring factory in the world, with a capacity of 1,920,000 springs a year, sufficient to equip 540,000 motor vehicles. Production will be 3000 tons of springs per month. A new spring forming machine forms, quenches and hardens an eight-leaf spring at each revolution, in one minute.

Hares, Motors, Inc., 16 West 61st St., New York, announce further additions to the organization personnel. P. W. Hine, until recently Locomobile division distribution manager, has been made general distribution manager, with offices in New York. C. B. Morse, who was advertising manager of the Packard Motor Car Company, has become general advertising manager, with offices in New York. C. R. Norton, former general distribution manager for the Packard for seven years, has been assigned the Hare's western field.

The Transport Truck Co., Mount Pleasant, Mich., is presenting life and accident insurance to its workmen. Three months' employees have a \$250 life insurance policy, after six months' service this is increased to \$500, after nine months to \$750, after a year to \$1200, after two years to \$1250. After three years the workman has permanently the benefit of a \$1500 policy. Compensation insurance and sick and accident benefit insurance, up to 60 per cent of pay, is also given.

The Commonwealth Motors Co., makers of Commonwealth cars and marine engines, has increased its capital stock from \$400,000 to \$6,000,000.

The Gardner Motor Co., St. Louis, through its president, Russell E. Gardner, announces plans that are intended to make the firm one of the largest car producers in the United States. Some \$1,500,000 worth of company stock has been bought by two banking firms, and President Gardner predicts 15,000 to 18,000 cars as the 1921 production.

The Eismann Magneto Corporation, in its statement for the first six months of 1920, throws light upon the situation of the automobile industry as a whole, as reflected in the production of ignition apparatus. Orders

The Highways Motor Co., Defiance, Ohio, a \$1,500,000 corporation, is preparing to install machinery in its new plant, and will build engines for cars, trucks and tractors

The United States Tire Co., for purposes of expansion programs which have been progressing for some months at the tire factories in Hartford, Conn., Indianapolis, Ind., Detroit, Mich., and Providence, R. I., has sold \$20,000,000 in notes to Kuhn, Loeb & Co., New York, securing the notes with \$25,000,000 of the company's bonds.

The Dragon Motors Corp., a recent incorporation of \$1,000,000 has purchased the W. N. Selig motion picture plant in Chicago, Ill., and will transform it into an automobile factory. \$400,000 is the reported price.

The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., have notified all jobbers that "there will be no reduction in prices this year, and starting January 1, 1921, we will protect you against loss through price reduction for 60 days after the purchase of goods."

The Root & Van Dervoort Engineering Company, East Moline, Ill., has separated the operation of the departments devoted to the manufacture of automobiles and of motors. Hereafter there will be two general manufacturing divisions.

The Dole Valve Co. have moved into their new plant, 1923 Carroll Ave., Chicago, Ill.

The Philadelphia Rubber Works Co., Akron, Ohio, and New York, has secured one hundred acres in Buffalo, N. Y., adjoining the plant of the Dunlop American, Ltd. Railroad connections, a pipe line and other developments are being pushed energetically.

Sewell Cushion Wheel Co., Detroit, Mich., reports sales for first six months of 1920 with an increase of 136 per cent over the corresponding period in 1919. This increase has been largely due to sales expansion program which was inaugurated early in 1920 when sales offices were opened in Los Angeles, San Francisco, Portland, Seattle, Butte, Salt Lake City, Atlanta, Memphis, Nashville, Akron, Steubenville, Wheeling and New Orleans. A national account division was recently established in Chicago, Ill., under the supervision of Mr. James V. Lyons, formerly central western representative of the American La France Fire Apparatus Co., Elmira, N. Y.

The Luedinghaus-Espenschied Wagon Co., St. Louis, Mo., makers of farm wagons and logging trucks for 77 years, are now manufacturing trucks. Model K, 2-ton capacity, is the first truck, and a complete line, including 1-ton and 1½-ton sizes, is contemplated. The new 2-ton, Model K has a Waukesha 4-cylinder, 4½ x 5½ engine, Borg & Beck clutch, Detroit selective transmission, and a Wisconsin worm-drive axle with ratio of 8:66 to 1.

Explosive Trades, Ltd., of London, England, has bought \$25,000,000 of General Motors stock. It is known that General Motors proposes to some day enter the British field, with factories in England, modeled after American plants.

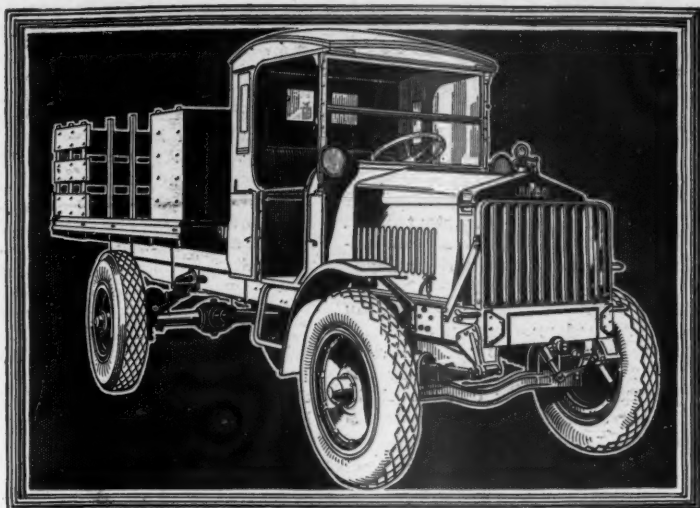
The Columbia Axle Co., Cleveland, Ohio, has bought the land and property of the Properties Company, by buying the common stock, a deal approximately of \$1,000,000.

The Samson Tractor Co. of Canada, Ltd., has selected Oshawa, Ontario, for the manufacture and distribution of Samson tractors, trucks and farm implements.

The American Valve Rotator Co., a new Milwaukee firm with \$100,000 capital, will manufacture a recently patented device for rotating poppet valves. The invention has been perfected at the plant of the Waukesha Motor Co., Waukesha, Wis., under direction of H. L. Horning, president and chief engineer.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has increased its capitalization from \$8,000,000 to \$12,000,000. The company operates five large plants, including two at Two Rivers, Wis., one in Newark, N. J., and one in St. Louis, Mo.





# Present Day Transportation Calls for Tonnage with Speed

The Jumbo Highway Express meets those requirements. It carries a full two ton load at 25 miles an hour *with safety* to the truck and load.

It has the power and strength for long, dependable service. It has the equipment for efficient, economical, comfortable operation.

This latest Nelson achievement is a big step forward in motor truck transportation, as a glance at the following brief specifications and partial list of equipment will show.

This epoch-making truck is the result of the Nelson policy of knowing the requirements of truck owners—and promptly supplying those needs.

A few direct factory contracts available for responsible dealers. Exclusive territory and thorough sales co-operation comprise a portion of our sales plan.

*Write for full details and literature*

**Nelson Motor Truck Company**  
Saginaw, Michigan

## *Brief Specifications and Equipment*

Standard 56-inch tread, Buda Motor, Clark Internal Gear Drive Axle, Clark Steel Wheels with pneumatic tires, power tire pump, power take-off, electric lights, starter, horn, generator and storage battery.

Steel cab with 3-man seat, heavy cushions, foredoors and disappearing curtains opening with doors, clear vision windshield, motometer, hub odometer, pigtail tow hooks, spring draw-bar and many other features. No extras to buy but the body.

**J U M B O**  
*The Complete Truck*

**The COMPLETE Truck**

and contracts on hand January 1, 1920, totalled \$2,978,362, a million and half increase over the corresponding date of 1919. Orders and contracts on hand July 1, \$3,442,380, an increase of 100 per cent over July 1, 1919. The net sales of the Eisemann Magneto Corporation for the first six months of 1920 were \$2,316,482. For the last six months of 1919 sales were \$1,665,681, the first six months of 1920 showing an increase over the preceding year of \$650,000.

The Dallas Brass & Copper Co., Chicago, Ill., have moved into their new \$400,000 building, 820 New Orleans St., which is a highly modern structure with 100,000 sq. ft. of floor space, enabling the company to double its productions. With three stories and a basement, construction will permit two additional stories when needed. There is an elaborate roof garden for employees.

The Mac-Lar Battery Company, of Detroit, Mich., has been changed from a Delaware to a Michigan corporation, and capital placed at \$125,000.

The Garford Motor Truck Co., Lima, Ohio, has charted its sales for the first quarter of 1920, and shows an increase of 313 per cent over the first quarter of 1919, and report very active inquiries from prospective truck buyers all over the country. Factory production will soon be doubled by the completion of a new progressive chassis assembly plant under construction since winter.

Franklin Products, Inc., 1052 South Clinton St., Syracuse, N. Y., is a subsidiary of the H. H. Franklin Mfg. Co., Syracuse.

The United States Tire Company held a three-day conference of its truck tire experts July 12, 13 and 14, opening with an afternoon session, with evening theatre party, in New York, and a day of solid tire study and another of pneumatic truck tire study, at the Providence, R. I., factory. The attendance at the conference was from every state east of the Rockies. George S. Shugart, vice-president and general sales manager, was presented with a set of platinum and pearl studs and buttons.

The Hercules Mfg. Co. is now the name of the recently purchased Hercules Electric Co., Indianapolis, Ind., acquired by Remy Brothers, founders of the Remy Electric Co., Anderson, Ind. The consideration is said to be \$250,000. The new company manufactures magnetos and electrical devices.

The Willys-Overland Co., Toledo, Ohio, expects to reduce its coal bill one-half by direct distribution of saw dust and waste wood through pipes to the furnaces. Special devices will distribute the fuel over the fires to secure maximum combustion and heat. Ten furnaces now burn saw dust where six did formerly.

The L-M Axle Company, incorporated for \$1,500,000 Cleveland, Ohio, will start work in August upon three factory units, and announces that 1000 men will be employed when full production is reached.

The Latex Tire & Rubber Co., Fond du Lac, Wis., has started upon production.

The Rowe Calk & Chain Co., Plantsville, Conn., has been awarded a contract by the United States Post Office for traction chain equipment to be used on solid tired trucks for the year ending June 30, 1921.

Dixie Rubber Co., Memphis, Tenn., has started work on its million-dollar plant at Hollywood, on a 15-acre site.

The Multonomah Truck Co., Vancouver, Washington, has completed plans for a factory in which two lines of trucks will be manufactured.

Red Diamond Motors, recently organized with \$5,000,000 capital, has had plans drawn for a plant at Atlanta, Ga. Machinery has been ordered and production this year is predicted.

The LeRoI Company, makers of "LeRoI" engines for passenger and commercial cars, and tractors, Milwaukee, Wis., has increased its capital stock from \$350,000 to \$700,000 to meet pressing demands for enlargement, and to provide for larger future output.

North East Electric Co., Rochester, N. Y., has increased its capital stock from \$3,000,000 to \$6,000,000 to erect new buildings.

## Association News

The Tennessee Automotive Trades Assn. convention at Chattanooga, Tenn., closing July 19, elected James S. Frazier, Nashville, president; T. H. Smart, Memphis, vice-president, and Henry Hart, Chattanooga, treasurer. New by-laws were adopted.

The Automobile Trade Association of Prince Edward Island, Charlottetown, P. E. I., has branches all over the island, and all business is done through the head office.

The Automotive Equipment Association's show will be in the Coliseum, Chicago, Ill., November 15 to 20, and will include the leasing of the equipment of the American Railway Appliance Company, a very attractive exhibit in itself.

The Idaho Automotive Trades Association has been formed in southern Idaho and selection of headquarters will be left to the directors. Twin Falls, Pocatelle and Boise are all seeking the office. A. V. Comings, of the Chilton Company editorial staff, was one of the speakers at the organization meeting.

The Intermountain Automobile Dealers' Assn., Salt Lake City, had a luncheon July 8 in honor of A. V. Comings, of the Chilton Company editorial staff, when he passed through the city on his way East from a Pacific coast trip. Mr. Comings spoke upon the splendid work done by associations throughout the country.

The Motor Truck Manufacturers' Assn., Chicago, composed of leading truck manufacturers in the United States, has placed its advertising account with the Akron Advertising Company, Akron, Ohio.

The Vermillion County, Ill., Automotive Assn. has voted that it is its duty to co-operate with motor clubs and public authorities in prosecuting violators of traffic and speed laws to the end, that the highways may be safe for law-abiding motorists, and all others using the roads.

The Automotive Electric Service Assn. has been formed with D. W. Burke, of the Automotive & Electric Service Corp., Detroit, Mich., as president. It will affiliate with the Automotive Electric Assn., which is made up of manufacturers. Co-operation between service members and manufacturers, use of only genuine parts for repairs and replacements, the raising of standards of service, obtaining statistics, and discussion constitute the aims. Membership open to service stations representing one or more manufacturers of electric automotive equipment.

## Obituary

Philip Sydney Post, vice-president of the International Harvester Co. died June 27. He was born in Vienna in 1869 while his father, Gen. Philip Sidney Post, was American consul general there.

## Lumber Concern Standardizes on Trailmobile

After trying a number of systems of motor delivery for lumber, The Clem Lumber Co., of Dallas, Texas, have standardized on four-wheel Trailmobiles. In a single day they have delivered as much as 30,000 ft. of lumber a distance of two miles from their yards, using one truck and Trailmobiles, sometimes two or three Trailmobiles in a train. With this system of delivery they save the waiting time of truck and driver while the loads are being made up in the yards and unloaded at the job. Occasionally when three or four small orders are to go in the same direction, they can be loaded on a Trailmobile in the absence of the truck and delivered at the same time.

The National Association of Motor Truck Sales Managers held a convention at Lake Geneva, Wis., the last week in June. A great deal of business was discussed, and Alfred Reeves, general manager of the N. A. C. C., was present.



The Utilization of the Motor Truck is Evidenced Everywhere, No Matter How Geographically Obscure the Region Where It is Employed May be

The above illustration shows a five-ton U. S. Motor Truck hauling oil and oil cans for the Standard Oil Company at Delhi, India. The traditions and superstitions of this land concerning the incompressible apparently does not affect the coolies employed by the Standard Oil Company, as they appear to be perfectly at ease—probably due to their confidence, found through experience, in the horseless wagon on which they are riding, to carry them successfully to their destination.



# POLACK

## TRUCK TIRES

### 70 to 75% Pure Hevea Rubber in Polack Tires

After everything is said and done, it takes rubber to make a good tire—not alone any kind of rubber—but good rubber—and plenty of it.

Hevea rubber is recognized as the best.

The Government specifies "Hevea" in rubber products subject to severe wearing strain—65% of it for solid tires.

Every Polack Tire contains 70 to 75% of pure Hevea rubber.

That alone puts Polack Tires into a class by themselves—unsurpassed for wear and efficiency.

**Distributors in open territory, write us  
now for our exclusive proposition**

POLACK TYRE & RUBBER CO.

1876 Broadway

New York

Branches in Leading Cities

**SINCE 1899 WORLD'S STANDARD**

# Metal and Rubber Markets

## Car Supply Inadequate and Prospects Are Poor

Buying in the local territory was far from brisk, according to all reports available at local offices. The feeling on the part of the steel producers is that the railroad may soon be counted upon for greater demand for steel products. Increasingly large orders for cars and locomotives are confidently expected as soon as the rate decision of the Interstate Commerce Commission is made public. Railroads are said to be showing increased interest in building material. Some bridge work which has been awaiting action for some time past is believed to be about ready for contracts.

### Steel Products Prices

Per ton—Pittsburgh—		
Bessemer billets .....	\$65 00	a 70 00
Open hearth .....	65 00	a .....
Forging billets .....	85 00	a .....
Sheet bars .....	70 00	a 80 00

### Sheets

The following prices are for 100-bundle lots and over f. o. b. mill:

Blue Annealed Sheets—		
Pittsburgh (base) .....	6 00	a 7 00
Philadelphia .....	6 25	a 7 25
Chicago .....	6 27	a 7 27
Galvanized Sheets of Black Sheet Gauge—		
Pittsburgh .....	7 50	a 8 25
Chicago .....	8 02	a 8 52
Tin—Mill Black Plate—		
Pittsburgh .....	7 00	a 8 00

### Structural Material

Structural shapes, Pittsburgh .....	\$2 45	a 3 75
Structural shapes, Philadelphia .....	2 70	a 4 00
Structural shapes, N. Y. ....	2 72	a 4 02

### Finished Iron and Steel

Steel hoops and bands .....	5 50	a .....
Tank plates, Pittsburgh .....	3 25	a .....
Tank plates, New York .....	3 77	a .....
Steel bars, New York .....	3 50	a .....
Steel bars, Pittsburgh .....	2 35	a 4 00
Rails—Standard Bessemer sections, tions, mill .....	45 00	a 60 00
Stand., open hearth, mill .....	47 00	a 62 00
Light sections—25 & 45 lbs. ....	2 45	a 3 75

### Iron and Steel at Pittsburgh

Bessemer iron .....	\$47 40	a .....
Bessemer steel f. o. b. Pitts. ....	60 00	a 65 00
Skelp, grooved steel .....	3 25	a .....
Skelp, sheared steel .....	3 50	a .....
Ferromanganese (80%) .....	200 00	a225 00
Steel, melting scrap .....	27 00	a 27 50
Steel bars .....	3 50	a .....
Wire rods .....	70 00	a 80 00
Iron bars .....	4 75	a .....
Plain wire .....	3 50	a .....
Plain wire, galvanized .....	3 70	a 4 70
Cut nails, nominal .....	6 19½	a .....
Wire nails, Pittsburgh .....	4 00	a .....
Steel hoops .....	5 50	a .....

**ANTIMONY.**—A steady tone is reported and sales are recorded at 7½c per pound wholesale and 7¾c retail. London cables £60 per ton.

**GRAPHITE.**—Very little business is stirring and outlook not promising for any increased demand later in the year. Crude Mexican ore is quoted at \$31 80 per ton New York. Selected amorphous runs between \$45 and \$55 a ton. Korean is held at 3¼c a pound. Madagascar 8c a pound and Ceylon 4¾c to 15½c a pound.

**TUNGSTEN.**—The lowering of prices has had the effect of encouraging foreign trade in the market, according to authorities who say that the indifference of domestic buyers to get ore no matter what the price caused sellers to look abroad for business.

**OLD METALS.**—Aluminum and copper scrap are quiet and steady. Prices unchanged. Lead is strong, smelters offering 8¼c delivered with large buyers

demanding 8½c. There is less demand from consumers for block tin scrap and pewter dishes on account of the unsettled conditions in pig tin. For these grades 44c and 37c, respectively, have been freely offered but there are no supplies available.

Aluminum—	Buying.	Selling.
Cast scrap .....	22 a22½	25 a25½
Sheet scrap .....	20 a21	22 a22½
Clippings .....	25 a26	27¾a28
Copper—		
Heavy machinery comp. ....	13¾a13¾	16 a16½
Heavy and wire .....	13¾a14	14½a15
Light and bottoms .....	12¾a12¾	13¾a13¾
Heavy, cut and crucible .....	14¾a14¾	16 a16½
Brass, heavy .....	7¾a 8¾	9 a 9¾
Brass, casting .....	9¾a 9¾	11 a11½
Brass, light .....	7¾a 7¾	8¾a 8¾
No. 1 clean brass turnings .....	7¾a 7¾	8¾a 9
No. 1 comp. turnings .....	10¾a11½	12¾a13½
Tea lead .....	4½a 5	5½a 5¾
Lead, heavy .....	7¾a 7¾	8¾a 8¾
Zinc scrap .....	4¾a 4¾	5¼a 5½
Solder joints .....	10 a10½	11 a11½
New zinc clippings .....	5 a 5½	5 a 6½
Pewter dishes .....	33 a34	36 a37
Block tin, scrap .....	41 a43	44 a45

**OTHER METAL PRODUCTS.**—Following are the prices current for brass and bronze products:

Copper sheets, not rolled .....	29 50c	a .....
Copper bottoms .....	38 00	a .....
Seamless tubing, bronze .....	34 50	a35 50
Seamless tubing, copper .....	32 00	a .....
Copper rods .....	26 75	a27 50
Copper wire .....	21 50	a22 00
Cut lead sheets .....	12 25	a .....
High brass wire .....	25 25	a .....
High brass sheets .....	25 25	a .....
High brass rods .....	23 75	a .....
Low brass sheets .....	27 25	a .....
Low brass wire .....	27 25	a .....
Low brass rods .....	28 00	a .....
Nickel silver, 18% .....	39 50	a .....

## Oxweld at San Francisco

The Oxweld Acetylene Company, manufacturers of oxy-acetylene welding and cutting apparatus, has established Pacific Coast sales and distributing headquarters at San Francisco, with offices at 1077 Mission St. Additional sales representatives' offices are maintained at the following points: Los Angeles, 646 Maple Ave.; Salt Lake City, 908 Kearns Building; Portland, 90 First St.; Seattle, 433 Pioneer Building. Mr. Leo Romney, with headquarters at San Francisco, is Pacific sales manager. The territory embraces the states of Washington, Oregon, Idaho, Utah, Arizona, California, Nevada and the counties of Lincoln, Sweetwater and Uintah in Wyoming. This territory was formerly served from Chicago and Los Angeles. Removal of headquarters to San

Brazed tubing, brass .....	38 00	a .....
Brazed tubing, bronze .....	42 75	a .....
Brazed tubing, copper .....	42 75	a .....
Seamless high brass tubing .....	30 50	a .....
Seamless low brass tubing .....	33 00	a .....
Sheet zinc .....	12 50	a .....

## Rubber Quiet

Near Positions Steady But Indications of Weakness in Those Far Off

Quotations were nominally 29½c for ribbed smoked sheets on spot or for July or August arrival, 30½c for September, 32½c for October, 33½c for November-December, 37c for January-March, and 38c for January-June. Paras and Centrals remained dull and nominal.

Para—Up-river, fine .....	35 a ..
Up-river, coarse .....	23½a ..
Island, fine .....	31½a ..
Cauchó, ball, upper .....	23½a 25
Cauchó, ball, lower .....	21 a 22
Cameta .....	18 a ..
Plantation—First latex, crepe .....	29½a ..
Brown crepe, thin, clean .....	29½a ..
Rolled, brown, crepe .....	27½a ..
Smoked ribbed sheets .....	29½a ..
Centrals—Corinto .....	22 a ..
Esmeralda .....	22 a ..
Guayule, wet .....	24 a 25
Balata, block, Ciudad .....	*55 a 57
Balata, block, Panama .....	*44 a 45
Balata, sheet .....	*1 00 a ..
Mexican—Scrap .....	*22 a ..

\*Nominal.

**SCRAP RUBBER.**—Extreme depression exists in this market, with little prospect of improvement in the near future. The tone is weak and prices are nominal.

Boots and shoes .....	6½a ..
Arctics, trimmed .....	5½a ..
Arctics, untrimmed .....	4½a ..
Tires—Automobile .....	3 a ..
Bicycles, pneumatic .....	2½a ..
Hose, steam, fire .....	.. a 1½
Inner tubes, No. 1 .....	.. a14½
Inner tubes, No. 2 .....	.. a 7

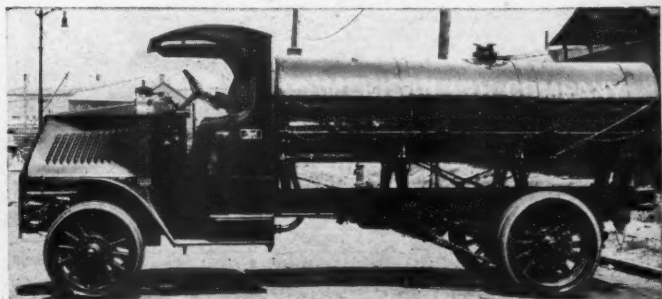
Francisco was made necessary to secure a more central location for supplying the company's rapidly growing business in the Pacific states where Oxweld apparatus is extensively used in the metal industries and shipyards.

## Motor Bus Company Formed

Interests closely related to the Bethlehem Motors Corp., Allentown, Pa., plan the formation of a company to foster the use of motor busses throughout the country. A bus body plant is one of the aims, a new chassis, expert study of transportation fields, tabulation of accurate costs, and sales to city and rural communities of single vehicles, or fleets, are among the proposed activities of the new company.

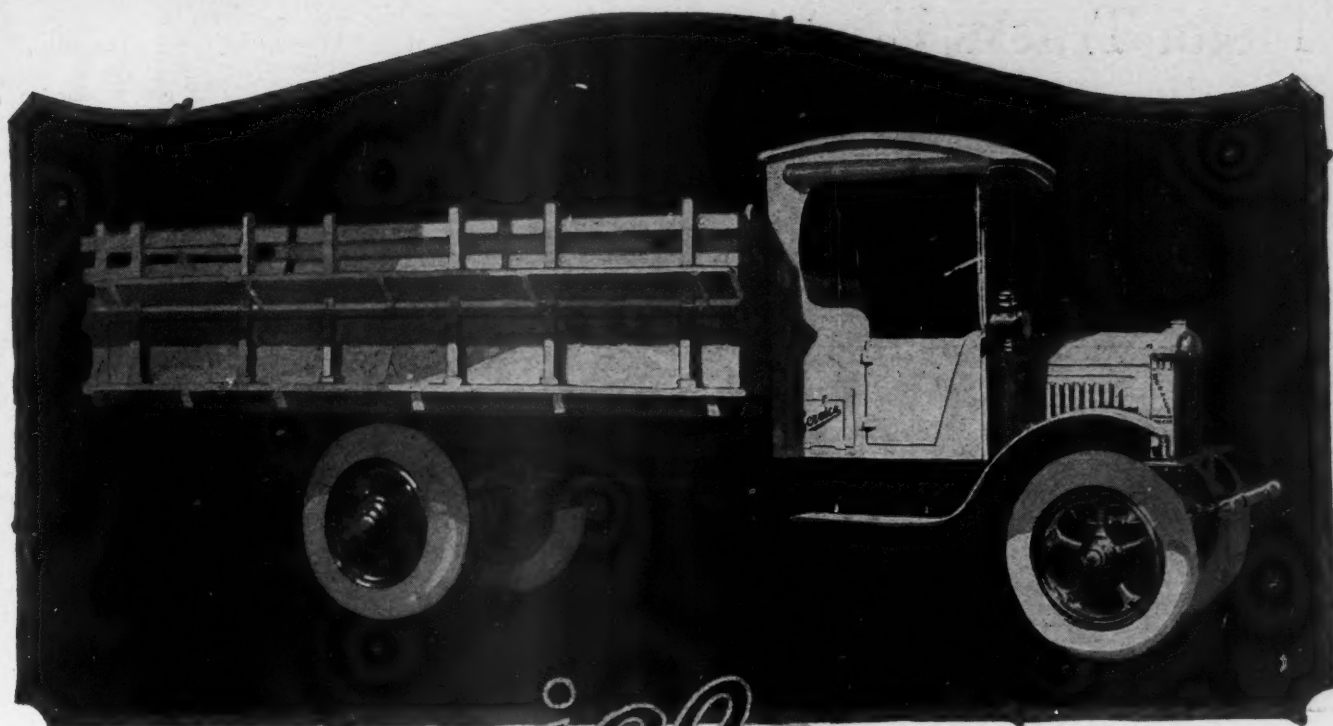
## This Truck Delivers Seven Hundred and Fifty Gallons of Ink at a Time.

Transporting ink in a 750-gallon tank would hardly seem feasible to those who consider a pint bottle of this commodity a large quantity. Nevertheless, the American Ink Co., of Hoboken, is using a Mack tank truck of this capacity to supply New York newspapers. In a modern newspaper building ink is stored in a tank near the roof.



This tank is connected with the presses by means of pipe lines. The truck delivers the ink in bulk attaching a hose to the filler pipe outside of the building. Through this pipe the ink is rapidly pumped up to the storage tank. When the sales engineers of the International Motor Company first considered transporting ink in bulk, they were forced to find some method to prevent the inks congealing in cold weather; the exhaust pipe of the engine is passed through the tank.





# Service

## MOTOR TRUCKS

### Builders of Business

#### 80 COMBINATIONS

*Service Trucks* are built in eighty different combinations of power, speed and capacity, from which is selected the truck having just the right qualities to serve the purchaser's individual requirements. All parts are designed for simplicity and quality. The truck has superior physical balance. The engine is not destructive to driving parts. The carrying members will not weaken under the loads they are intended to support, yet all parts have ample power and strength to move capacity loads. The problem of moving your goods quickly, efficiently and economically will find its answer in the reliable character of past *Service* performance—a record that has won faith and good will of *Service* owners everywhere.

The *Service* Dealer's Franchise offers two definite advantages:

1—The product—a *truck* that has been recognized on the basis of past performance as the standard motor carrier—a truck that is built in eighty different combinations of *power, speed and capacity* from which to choose the one best suited to the buyer's *exact* requirements.

2—The *entire* co-operation of an organization of ample financial resources established on the sound foundation of success—*co-operation* that from *factory service* to *advertising* is a *real tangible asset*.

No stronger proof of *Service* superiority could be given than the *remarkable* record of repeat orders—68% of each year's output is sold to businesses that already have *Service Trucks* in use. *Service dealers prosper accordingly*.

If you are in a position to sell Motor Trucks, and if the territory you desire is open, we can offer you a most desirable proposition. Send for complete details today.

**SERVICE MOTOR TRUCK CO., Wabash, Ind., U. S. A.**

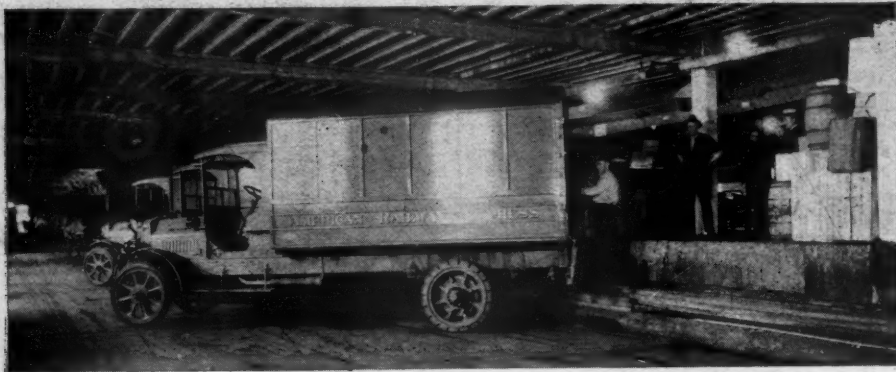
NEW YORK—87-89 West End Avenue

CHICAGO—2617-25 South Wabash Avenue

## Motor Trucks Used in Place of Railroads for "Short Hauls"

**T**HE practicability of the motor truck as an economical transportation unit for the moving "short haul" express matter in co-operation with the railway express business is rapidly becoming accepted as an essential addition for lowering costs and increasing

express cars. They are loaded with freight at one terminal, sealed and further protected by a reversible tail-board held in position by chains, and the trucks are sent to destination, without being opened or interrupted en route.



**Railway Adopts Express Motor Trucks for Moving "Short Haul" Express Matter Between Jersey City and Passaic and Paterson, New Jersey**

service by even the most obdurate of railway companies. As an experiment, carried on by the American Railway Express Co., all freight of this character between New York City and Passaic and Paterson, N. J., is being carried over the highways

Ten trucks are now employed in moving express matter between these cities and the railroads, which are themselves much congested, are relieved of this "short haul" express traffic. The experiment was undertaken because of the



**Loading Express Truck From Railway Freight Station Preparatory to a Twenty-Two Mile Run**

Note locking device on rear doors, similar to those employed on sealed cars

by a new fleet of motor trucks specially constructed for this service.

The trucks, which are equipped with large "van" bodies having end-doors that can be securely locked and sealed, are used much in the manner of "through"

shortage of express cars, which made it difficult for the express carrier to carry on its business. The distance traveled by the trucks assigned to either city have a 16 mile run, in case of Passaic business, and 22 miles to Paterson.

### 2,800,000 Gallons Gain in Gasoline

#### Bureau of Mines Reports:

April Consumption of Gasoline, 8,591,912 gal.; April Production of Gasoline, 11,421,843 gal.; April Reserve Stocks, 643,552,644 gal.

#### American Petroleum Institute says:

Cracking plants which will increase the efficiency of the refining processes,

and therefore the quantity of gasoline, are being installed on the Pacific coast.

#### William Albert White says:

The rapid development of fuel oil burning leads to the question: "Is the production of fuel oil assured?" The answer is unquestionably, "Yes."

Gasoline supplies are increasing nationally and on the Pacific Coast, according to Bureau of Mines figures and the American Petroleum Institute.

The bogey of shortage is being dispelled by the official reports which show that during April, the last month for which there are figures, production of gasoline was 2,829,931 gal. ahead of the demand. Consumption was 8,591,912 gal., whereas output was 11,421,843 gal. Reserve stocks increased to 643,552,644 gal., which showed a considerable gain on the March figure of 626,393,046 gal. in reserve.

States on the Pacific Coast have been suffering shortage in spite of the general plenty, because of local conditions. This situation is passing. The American Petroleum Institute reports: "No expense or effort to provide sufficient gasoline to supply the Pacific Coast demands is being spared."

Arizona, Nevada and eastern parts of Oregon and Washington are being supplied to some extent from the Mid-continent and Wyoming fields. Practically all this business was supplied last year from California.

Improved refining processes are being introduced in the California field, which will greatly increase the possibilities of output in that territory within a few months. Many fields are getting only 12 to 15 per cent. of gasoline from the crude. With the best cracking machinery this percentage can be at least doubled. Some fields get over 40 per cent. of gasoline from the crude.

During the present emergency exports from Pacific ports are being kept down to 3 per cent. of the total production. Only contractual obligations already assumed are being met, and no new foreign business is being sought. In 1918, the exports from the Pacific ports were 18 per cent. of the production in that region, as compared with the present 3 per cent.

#### Expert Cites Mexico as Future Provider

Motorists need to continue a careful conservation policy as the rate of consumption increase during the past four months was 33 per cent., as against the rate of increase in production, which was 13½ per cent. This means that inroads are being made on the potential supplies of crude oil. William Albert White, however, makes some reassuring statements on oil in the New York Times of July 11, 1920. Mr. White is the inventor of the low pressure oil feeding system which has been installed in 700 ships. He does not believe that the increase of oil burning ships will exhaust the supply of petroleum, but sees a great future producer in Mexico.

"The rapid development of fuel oil burning on shipboard," says Mr. White, "and particularly its adoption by the leading steamship companies, leads to the question: 'Is the production of fuel oil assured?' The answer is unquestionably, 'Yes.'"

"The present daily potential production of Mexico (but not exported) is around 762,080, or 278,160,000 barrels a year, and this out of a very small percentage of the petroliferous area."



